APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

OPERABLE UNIT 1

QUANTA RESOURCES SITE
EDGEWATER, NEW JERSEY

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May 2005

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Project Manager: _____ 5/18/05
Date

QA Officer: _____ 5/18/05
Date

May 2005

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In accordance with the Administrative Order on Consent (AOC) for OU1, all work plans, reports, notices, and other documents will be submitted via certified mail return receipt requested, or overnight mail to the following addressees:

NUMBER OF COPIES	TO
7 (Including 1 unbound copy)	ATTN: Quanta Resources Site Remedial Project Manager New Jersey Remediation Branch Emergency and Remedial Response Division U.S. Environmental Protection Agency, Region II 290 Broadway, 19th Floor New York, New York 10007-1866
1	ATTN: Quanta Resources Site Attorney New Jersey Superfund Branch Office of Regional Counsel U.S. Environmental Protection Agency, Region II 290 Broadway, 17th Floor New York, New York 1007-1866
4	ATTN: Quanta Site Manager Bureau of Federal Case Management New Jersey Department of Environmental Protection 401 East State Street P.O. Box 028 Trenton, New Jersey 08625-0028
4	Tim Metcalf Honeywell International, Inc. 101 Columbia Road, MEY-3 Morristown, New Jersey 07962
2	Paul Feshbach-Meriney Parsons 100 Summer Street, 8th Floor Boston, Massachusetts 02110

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SECTION 1
PROJECT MANAGEMENT ELEMENTS

1.1 PROJECT/TASK ORGANIZATION

The organization and responsibilities of the project team are described in detail in Section 4 of the Remedial Investigation / Feasibility Study (RI/FS) Work Plan. It should be noted that the Quality Assurance (QA) Manager is independent of those collecting project information. The RI Manager will be responsible for maintaining the official Quality Assurance Project Plan (QAPP). Figure 1-1 and the table below lists the individuals involved with major aspects of this project.

NAME	ORGANIZATION	ROLE
Richard Ho	USEPA	USEPA Project Manager
Robert Hayton	NJDEP	Quanta Project Manager (NJDEP)
Tim Metcalf	Honeywell International	Respondent's primary contact for the site.
Paul Feshbach-Meriney	Parsons	Project Manger
Susan Fullerton	Parsons	Technical Director
Gregory Beck	Parsons	Health and Safety Officer
Chunhua Liu	Parsons	QA Manager
James Goldrick	Parsons	RI Manager
Theodoros Toskos	Parsons	FS Manager
Ayesha Dolasa	Parsons	Field Team Leader
Steven Grant	Accutest	Laboratory Manager / Technical Director
David Craig	Meta Environmental	Laboratory Director
Gary Parent	Shore Drilling	Driller
Paul Emilius	GEOD Corporation	Surveyor

1.2 PROBLEM DEFINITION/BACKGROUND

The Quanta Resources, Inc. Edgewater NJ property is located in Bergen County at 163 River Road, Edgewater, New Jersey. The property is bordered to the north by the former Celotex and Lustrelon properties. The Spencer Kellogg property is located to the south. The Hudson River borders the Quanta property on the east and the (old) River Road borders the property to the west. The new River Road is located east of its former location and bisects a portion of the Quanta property. In-depth site description and background information is presented in Sections 1 and 2 of the Work Plan. Releases of non-aqueous phase liquid (NAPL) and other hazardous material will be investigated to determine the impacts at OU1 (soil and ground water) at the Quanta Site.

The objectives of the remedial investigation at the Quanta Site OU1 are to:

- Characterize potential soil and groundwater impacts associated with former site activities.
- Define the nature and extent of contaminants. And, delineate those impacts caused by the release or threatened release of contaminants at or from the Upland Area of the Site, including ground water and soil.
- Evaluate the potential for human health and ecological impacts.
- Develop supplemental data, sufficient to address data gaps within the investigations conducted to date, to determine the need for and to allow a screening of appropriate remedial alternatives, recommendation of the most appropriate remedial alternative, and the development of a refined conceptual site model.

1.3 PROJECT/TASK DESCRIPTION

The RI/FS at the Quanta Site will supplement data collected during previous investigations at the site. The RI/FS for the site will be completed in accordance with the schedule presented in the Work Plan. As part of the RI/FS, the following field investigations and tasks will be performed:

- Conduct soil borings and monitoring well installations;
- Collect ground water and soil samples to characterize nature and extent of contamination at the site;
- Perform aquifer and tidal study testing;
- Perform laboratory analysis of samples;
- Perform instrument survey;
- Perform building indoor air survey;
- Perform data validation, review, and interpretation; and
- Perform human-health base and ecological risk assessments.

All field activities, including a schedule, maps, and tables are discussed in detail in the Field Sampling Plan (FSP) and the Work Plan for this Site. Reports will be issued in accordance with the Work Plan and the Statement of Work for the Site.

1.4 QUALITY OBJECTIVES AND CRITERIA

The purpose of the QAPP is to present the quality assurance/quality control (QA/QC) procedures and to set forth the analytical methods and procedures to be implemented during the RI. The QAPP has been developed to provide data quality that is sufficient to meet the RI objectives

The data produced during the RI will be compared with the defined QA objectives and criteria for precision, accuracy, representativeness, completeness, and comparability (PARCC). The primary goal of these procedures is to ensure that the data reported are representative of actual conditions at the Site.

This data assessment activity is an on-going coordinated process with data production and is intended to assure that all data produced during the project are acceptable for use in subsequent evaluations. Both statistical and qualitative evaluations will be used to assess the quality of the data. The primary evaluation of the data will be based upon the control samples described in Section 2.5. The blank samples will be used to evaluate whether or not the laboratory represents a possible source of sample contamination and duplicate sample results will be used to evaluate data precision.

1.4.1 Data Quality Objectives

Data Quality Objectives (DQOs) are based on the premise that different data uses require different levels of data quality. Data quality refers to a degree of uncertainty with respect to PARCC. Specific objectives are established to develop sampling protocols and identify applicable documentation, sample handling procedures, and measurement system procedures. These DQOs are established on site conditions, objectives of the project, and knowledge of available measurement systems. As part of the DQO process, a conceptual site model (Figure 1-2) was prepared. The outputs of the seven-step DQO process are presented in a general format below, and also in more detail for the following investigation areas or major investigation activities:

- Subsurface Soil Investigation (Table 1-1),
- Ground Water Investigation (Table 1-2),
- Hydrological investigations (including water level measurements, insitu hydraulic conductivity testing, and determination of hydraulic gradient) (Table 1-3), and
- Indoor Air investigations (through a tiered approach as defined in USEPA guidance) (Table 1-4).

Step 1. State the Problem

The site conditions that present a potential threat or unacceptable risk to human health and the environment consists of the following elements:

- NAPL and DNAPL in upland (OU1) areas;
- Petroleum fuel, coal tar constituents, and other contaminants in surface and subsurface soils; and
- Dissolved petroleum fuel, coal tar constituents, and other contaminants in the upper (fill and silty sand) ground water zone, which could potentially impact indoor air.

The existing site data are not sufficient to completely characterize the contamination described above.

The program to address the contamination is governed by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) RI/FS process and the requirements of the New Jersey Department of Environmental Protection (NJDEP).

Step 2. Identify the Decisions that Address the Contamination Problem

Determine if unacceptable human health and ecological concerns exist due to potential exposure to Site contaminants via migration of contaminants into soil, ground water, and indoor air.

Step 3. Identify the Inputs that Affect the Decision

At OU1, soil and ground water sampling are needed to characterize concentrations of volatile organic compounds (VOC)s, semivolatile organic compounds (SVOC)s, polychlorinated biphenyls (PCB)s, hexavalent chromium (soil only), arsenic and lead. Additional samples are needed to characterize these constituents in these media.

The existing and new analytical data will be compared to applicable or relevant and appropriate requirements (ARAR)s, be used in risk calculation, or be used in analytical or numerical modeling to assess risks to human health and the environment.

Step 4. Define the Study Boundaries

The boundaries of the Quanta Site are areas where contamination from the former tar manufacturing and waste oil storage operations at the Quanta property has been deposited. The Quanta Site is divided into the upland portion (OU1) and the river portion (OU-2). OU1 includes the soil and ground water on the Quanta property, former Ceoltex property, former Spencer Kellogg property, and Uniliever property. OU-2 includes the sediment and surface water in the Hudson River adjacent to the upland portions of these properties.

At OU1, the contaminants are VOCs, SVOCs (including PAHs), PCBs, pesticides, arsenic lead, and hexavalent chromium in the fill and sand/silty sand hdyrostratigraphic zone; while

limited investigation is planned below the clay silt unit, it is believed to be an aquitard. In addition, LNAPL and DNAPL are also of interest in OU1.

The site contaminants were released to the environment decades ago and it is believed that most contaminants have reached a steady state in the environment, therefore, relatively short duration sampling (i.e., over several months) will be representative of existing and future conditions and boundaries.

Step 5. Develop and Identify the Decision Rules

If the sampling data suggest that there is an unacceptable risk in the various media being characterized, the appropriate remedial measures will be developed for the site.

Step 6. Specify Limits on Uncertainty

Analytical method will be used such that the reporting limits are lower or equal to the chemical ARARS for the site to avoid false negative errors.

Step 7. Optimize the Sampling Design for Obtaining Data

Since there exists environmental data for the site in ground water and soil (OU1), the sampling program is designed to fill in data gaps that exist in the characterization of the contaminants, as defined in the Work Plan and in Tables 1-1 through 1-4.

Soils are not well characterized on the site so a systematic sampling design (e.g., roughly equally spaced points) is proposed for soils.

Ground water on the site has been characterized during previous investigations, however, the extent of the impacts needs to be defined in the following areas: 1) upgradient areas, 2) areas to the south on the Unilever property, and 3) confined sands below the clay silt unit (although no significant impacts are expected in this hydrostratigraphic unit, given that the clay silt is an aquitard).

1.4.2 Precision

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value (USEPA, 1987). Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), relative range, and relative percent difference (RPD) are common.

For this project, field sampling precision will be determined by analyzing duplicate samples for the same parameters, and then, during data validation (Section 4) calculating the RPD for duplicate sample results.

The laboratory will determine analytical precision by calculating the RPD for the results of the analysis of internal QC duplicates and matrix spike duplicates.

The formula for calculating RPD is as follows:

$$RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \times 100$$

where:

RPD	=	Relative Percent Difference.
V1, V2	=	The two values to be compared.
|V1 - V2|	=	The absolute value of the difference between the two values.
(V1 + V2)/2	=	The average of the two values.

The data quality objectives for analytical precision, calculated as the RPD between duplicate analyses, are presented in Table 1-5.

1.4.3 Accuracy

Accuracy is a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern (Taylor, 1987), or the difference between a measured value and the true or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material, and is expressed as the percent of the known quantity that is recovered or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes that are close to the detection limits are less accurate because they are more affected by such factors as instrument "noise". Higher concentrations will not be as affected by instrument noise or other variables and thus will be more accurate.

Sampling accuracy may be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy is typically assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks. In accordance with USEPA CLP, a matrix spike blank (MSB) will be analyzed for organic analyses to provide additional information on analytical accuracy. Additionally, initial and continuing calibrations must be performed and accomplished within the established method control limits to define the instrument accuracy before analytical accuracy can be determined for any sample set.

Accuracy is normally measured as the percent recovery (%R) of a known amount of analyte, called a spike, added to a sample (matrix spike) or to a blank (blank spike).

The %R is calculated as follows:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where:

%R	=	Percent recovery.
SSR	=	Spike sample result: concentration of analyte obtained by analyzing the sample with the spike added.
SR	=	Sample result: the background value, i.e., the concentration of the analyte obtained by analyzing the sample.
SA	=	Spiked analyte: concentration of the analyte spike added to the sample.

The acceptance limits for accuracy for each parameter are presented in Table 1-6.

1.4.4 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter which is most concerned with the proper design of the sampling program (USEPA, 1987). Samples must be representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible; that the data derived represents the in-place quality of the material sampled. Every effort will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, and analysis. Decontamination of sampling devices and digging equipment will be performed between samples as outlined in the FSP. Laboratory sample containers will be certified clean. Analysis of field blanks, trip blanks, and method blanks will also be performed to monitor for potential sample contamination from field and laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. Sampling heterogeneity will be evaluated during data validation through the analysis of coded field duplicate samples. The analytical laboratory will also follow acceptable procedures to assure the samples are adequately homogenized prior to taking aliquots for analysis, so the reported results are representative of the sample received.

Chain-of-custody procedures will be followed to document that contamination of samples has not occurred during container preparation, shipment, and sampling. Details of blank, duplicate and chain-of-custody procedures are presented in Section 2.

1.4.5 Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid (USEPA, 1987). The QA objective for completeness is generation of valid (i.e., useable) data for at least 90 percent of the analyses requested. Completeness is defined as follows for all sample measurements:

$$\%C = \frac{V}{T} \times 100$$

where:

%C = Percent completeness.

V = Number of measurements judged valid.

T = Total number of measurements.

1.4.6 Comparability

Comparability expresses the degree of confidence with which one data set can be compared to another (USEPA, 1987). The comparability of all data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;
- Requiring traceability of all analytical standards and/or source materials to the U.S. Environmental Protection Agency (USEPA) or National Institute of Standards and Technology (NIST);
- Requiring that all calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable);
- Using standard reporting units and reporting formats including the reporting of QC data;
- Performing a complete data validation on a representative fraction of the analytical results, including the use of data qualifiers in all cases where appropriate; and
- Requiring that all validation qualifiers be used any time an analytical result is used for any purpose.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

1.4.7 Sensitivity and Quantitation Limits

In addition to PARCC criteria in assessing data quality, the achievement of method detection limits depends on instrument sensitivity and matrix effects. Therefore, it is important to monitor the instrument sensitivity to ensure the data quality through constant instrument performance. The instrument sensitivity will be monitored through the analysis of method blanks and calibration check samples.

Table 1-7 presents the quantitation limits for all definitive data quality level laboratory analytical methods, compounds, and matrices to be addressed for this project. Honeywell and the laboratory will establish agreed upon contract required quanitation limits prior to the collection of samples to ensure that the quantitation limits meet the ARARs. In some instances the analytical methods may need to be modified by the laboratory to meet specific ARAR parameters

1.5 SPECIAL TRAINING/CERTIFICATION

All personnel will be appropriately trained and certified as necessary. All persons involved in the fieldwork at the site will be appropriately Health and Safety Trained (i.e., 40-Hour OSHA and annual 8-Hour Refresher). The laboratory shall be a NJDEP- and USEPA CLP-certified. In addition, a New Jersey-licensed well driller will conduct all drilling activities and a New Jersey-licensed surveyor will complete all land survey work. Prior to commencing work, all personnel will be required to present any necessary certificates or licenses to the field team leader. A copy will be kept on-site and a copy will be forwarded to the Parsons.

1.6 DOCUMENTS AND RECORDS

The most current approved copy of the QAPP, SOPs, or other relevant documents will be distributed by the Parsons' Project Manager, or his designee. The recipient shall acknowledge receipt of the QAPP by returning a signed cover sheet. If or when a revised document is produced, the project manager or designee shall notify project staff verbally and then forward the current document.

Project data report packages will include selected reference materials, all field notes, (including soil boring logs, well construction logs, well development logs, sampling records, chain of custody forms, all well permits and records), analytical results and QA/QC data, and any other relevant documents produced during the RI/FS. Parsons will store these documents for 10 years. Copies of all reports will be distributed according to the distribution list and a copy of all reports will be made available at a Public Repository, the Edgewater Free Public Library.

TABLES

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
1	**STATE THE PROBLEM** (Summarize the contamination problem that will require new environmental data, and identify the resources available to resolve the problem)	
	• Identify members of the planning team.	The site manger for the Quanta Resources Site is Tim Metcalf of Honeywell. The regulatory agency in charge is the USEPA (Richard Ho is the USEPA Project Manager). The technical staff includes the following Parsons personnel: • Paul Feshbach-Meriney – Technical Project Manager and Hydrogeologist • James Goldrick – Geologist • Chunhua Liu – Human Health and Ecological Risk Assessor / Quality Assurance • Karen Field – Ecological Risk Assessor • Chunhua Liu – Human Health Assessor • Chunhua Liu – QA Specialist The stakeholders include the Quanta Site Assessment Group (QSAG), the State of New Jersey, and local residents.
	• Develop/refine the conceptual site model.	A Conceptual Site Model (CSM) has been developed for the Quanta Resources Site, based on previous investigations at the site. The CSM is presented in Figure 1-1 of the QAPP and Section 4.1 of the RI/FS Work Plan.

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Define the exposure scenarios.	**Surface soil** – Exposure from subsurface soils may result from ingestion, inhalation, and direct contact of recreational users, residents, and construction workers. Surface soils may runoff offsite and cause contamination in the Hudson River. **Subsurface soil** – Exposure from surface soils may result from ingestion, inhalation, or direct contact primarily to construction workers.
	• Specify the available resources and constraints.	The approximate monetary budget for data collection (include developing DQOs, constructing QAPP, sampling, chem.. analysis, data handling and interpretation will be developed when cost estimates are obtained from the contract laboratory prior to implementation of the Work Plan. Paul Feshbach-Meriney will be the project manager and will use Parsons employees from the Boston, Massachusetts, Somerset, New Jersey Office, and local subcontractors as necessary. Field equipment (including vehicles) will be purchased or rented as needed. While there are existing analytical from the former Celotex property that will be used to fill in data gaps for the Quanta RI, the recent placement of fill and redevelopment of this property will make collecting additional soil samples difficult (if required after analysis of the RI data). Time constraints for completing the required site evaluation include the availability of licensed well drillers and equipment, weather, and regulatory and public review of documents.

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Write a brief summary of the contamination problem.	A review of historical data from the site indicates potential impacts to soil and ground water from VOCs, SVOCs, PCBs, pesticides, arsenic, chromium (total), hexavalent chromium, and lead. NAPL (DNAPL and LNAPL) from historical release have migrated to the subsurface soils and ground water zone, and has migrated to the bulkhead near the Hudson River. Dissolved constituents in ground water have migrated toward commercial building (115 River Road) and may have impacted indoor air quality.
2	**IDENTIFY THE DECISION** (To identify the decision that requires new environmental data to address the contamination problem)	
	• Identify the principle study question.	Where do the soil contaminant concentrations exceed the corresponding ARARs or PRGs for the Site?
	• Define the alternative actions that could result from the resolution of the principle study question.	Alternative actions would be to delineate soil until below ARARs or PRGs for the site or initiate response actions. Alternatively, because the Site has a history of heavy industrial use, it may not be practical to delineate to below ARARs. In this case, the combination of reference soil sample results from off property area combined with practical transport pathways from the conceptual model may be used to provide information to determine that the site characterization is complete. In order to determine if soil poses a potential threat to human health or the environment or that it poses a unacceptable risk to human health or the environment the RI team may make the following Advanced Assessment Evaluations: (i) No further action is necessary (ii) Collect additional data (iii) Recommend a possible response action
	• Combine the principle study question and the alternative actions into a decision statement.	Determine where soil contamination exceeds ARARs or PRGs for the site and require further delineation, where response actions are necessary, or where no further action is required.

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Organize multiple decisions.	Several decisions will be needed to address soil contamination at the site. Has soil contamination been delineated? Does contamination in the soil pose a threat to human health or the environment? Several media including surface soil, groundwater, and indoor air will need to be evaluated prior to making final decisions on a site wide basis. In addition, decisions on the type of technology to use and the feasibility of implementing certain actions will be needed.
3	**IDENTIFY THE INPUTS TO THE DECISION** (To identify the information that will be required to support the decision and specify which inputs require new environmental measurements)	
	• Identify the information that will be required to resolve the decision statement.	A combination of sampling and modeling will be used to determine if soil contamination exceeds the ARARs or PRGs or if the contamination poses a risk to human health and the environment. Previous investigations indicate that NAPL (DNAPL and LNAPL) VOCs, SVOCs, PCBs, arsenic, hexavalent chromium, chromium (total), and lead need to be further investigated (see Step 6 for concentration ranges). Also, the presence or absence of pesticides is soil needs to be determined. The anticipated analytical methods to be used include the following: VOCs (OLM04.3), SVOCs (OLM04.3), PCBs (OLM04.3), Pesticides (OLM04.3), specific inorganics or TAL Metals (ILM05.2), hexavalent chromium (visible spectrophotometry (SW-846 Method 7196A). The presence of NAPL in soil will be evaluated using Sudan IV and UV Fluorescence field screening methods. Accutest Labs was consulted for analytical method information and performance.
	• Determine the sources for each item of information identified.	The sources (i.e., previous reports, USEPA and NJDEP guidance, USGS guidance and figures, ASTM standards) that will be used to resolve the decision statement are referenced in Section 2 of the OU1 Work Plan.
	• Identify the information needed to establish the action level.	Action levels will be developed using the residential scenario and USEPA Region 9 PRGs.

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Confirm that appropriate analytical methods exist to provide the necessary data.	Soil samples will be sent to a NELAP approved laboratory. The analytical methods to be used for chemical analyses of soil to provide the necessary data were confirmed with the laboratory (Accutest) and they are as follows: VOCs (OLM04.3), SVOCs (OLM04.3), PCBs (OLM04.3), Pesticides (OLM04.3), specific inorganics or TAL Metals (ILM05.2), hexavalent chromium (visible spectrophotometry (SW-846 Method 7196A). The presence of NAPL in soil will be evaluated using Sudan IV and UV Fluorescence field screening methods. Occasionally, it may not be possible to achieve the requested sample or detection limits due to the following: 1.) Diluted samples, 2.) Low percent solids, 3.) Matrix interference, or 4.) Poor QA/QC results.
4	**DEFINE THE BOUNDARIES OF THE STUDY** (To define the spatial and temporal boundaries that the data must represent to support the decision)	
	• Specify the characteristics that define the population of interest.	Previous investigations indicate that surface and subsurface soils are contaminated by DNAPL, NAPL, VOCs, SVOCs, PCBs, arsenic, chromium (total), possibly hexavalent chromium, and lead. Pesticides are also included in the population of interest. Therefore, the population of interest for soil includes the parameters that occur within the operable unit one (OU1).
	• Define the geographic area to which the decision statement applies.	The Quanta Resources site is located at 163 River Road in Edgewater, Bergen County, New Jersey. The property is bordered to the north by the former Celotex and Lustrelon properties, to the south by the former Spencer Kellogg property. The Hudson River borders to the east and River Road to the west.
		The Quanta Resources Site is divided into two operable units OU1 (the upland portion) and (OU2 the Hudson River portion). The geographic area to which the decision applies includes OU1 of the Quanta Resources Superfund Site.

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• When appropriate, divide the population into strata that have relatively homogenous characteristics.	The soils at the Quanta Resources Site include various strata that are that have relatively homogenous characteristics: 1. Surface Soils 2. Fill Material 3. Sand Silty Sand 4. Clayey Silt/Silty Clay 5. Sand (lower) 6. Bedrock
		Previous investigations at OU1 indicate that the majority of the contaminants detected are in the fill material and sand silty sand above the clayey silt/silty clay. The lower units (e.g., lower sand) are being investigated to determine is contaminants have migrated vertically on the Site.
	• Determine the time frame to which the decision applies.	All of the primary sources (e.g., above ground storage tanks, underground storage tanks, oil water separators) have been removed from the Quanta property; the study data will conservatively reflect the condition of contaminants present in the soil over a period of 50 years.
	• Determine when to collect data.	There is no sensitive time for collecting soil samples.
	• Define the scale of decision-making.	Given the location of OU1 and the considerable development that has occurred to the north and south of the Quanta property, the planning team choose to base the decision making for soil on the Quanta property, as this is currently the undeveloped portion of OU1. It also likely that the Quanta property will be developed as one development project.
	• Identify any practical constraints on data collection.	Potential constraints or obstacles on implementing the field sampling plan for soils may including the following: • Unsafe conditions, • Weather (Lighting, snow, ice, extreme temperatures), • Access to adjacent properties, • Obstacles (above/underground utilities, site operations), or • Equipment failure/malfunction.

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
		If further investigation of OU1 north of the Quanta property is required after the completion of sampling activities defined in the Work Plan, the recent placement of fill and boulders (up to ~20 feet) on the former Celotex property and the redevelopment of the former Celotex property will hamper soil sampling in this area.
5	**DEVELOP A DECISION RULE** (Develop a logical "If...then..." statement that defines the conditions that would cause the decision maker to choose among alternative actions.)	
	• Specify the statistical parameter (such as mean, median, maximum, or proportion) that characterizes the population of interest.	The scale that characterizes the population will be influenced by hot spots, background comparisons, and applicable standards. This would require the following statistical parameters: • Maximum • Average • Regulatory limits Given the remedial alternatives that may be considered (containment) the diameter of hot spots is an important parameter to be identified in the soils within OU1. The 95th percentile is also a parameter of interest in soils within OU1.
	• Specify the action level for the decision.	The action levels for soil shall be the Region 9 PRGs. The NJDEP SCC and SRC are to be considered.
	• Confirm that measurement detection limits will allow reliable comparisons with action level.	Honeywell and the laboratory will establish agreed upon contract required quanitation limits prior to the collection of samples to ensure that the quantitation limits meet the ARARs. In some instances the analytical methods may need to be modified by the laboratory to meet specific ARAR parameters.
	• Combine the outputs from the previous DQO steps and develop a decision rule.	If contaminants are detected in the soil in excess of the ARARs for OU1, then further delineation is required; otherwise no further evaluation is necessary. However, consideration will be given to the former heavy industrial use of the surrounding area and the presence of contaminants from industrial operations at other properties that were unrelated to operations at the Quanta property.
6.	**SPECIFY TOLERABLE LIMITS ON DECISION ERRORS** (To specify the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data)	

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Determine the possible range of the parameter of interest.	**VOC** Benzene (0.15-51.0 mg/kg) Toluene (0.52-310 mg/kg) Ethylbenzene (0.14-290 mg/kg) Xylene (0.11-200 mg/kg) **PAH** Acenaphthene (0.0086-1500 mg/kg) Acenaphthylene (0.018-260 mg/kg) Anthracene (0.01-1400 mg/kg) Benzo(a)anthracene (0.033-2100 mg/kg) Benzo(a)pyrene (0.037-2500 mg/kg) Benzo(b)fluoranthene (0.044-2800 mg/kg) Benzo(g,h,i)perylene (0.013-1400 mg/kg) Benzo(k)fluoranthene (0.014-1100 mg/kg) Chrysene (0.042-2300 mg/kg) Dibenzo(a,h)anthracene (0.031-390 mg/kg) Fluorene (0.027-1400 mg/kg) Fluoranthene (0.041-3600 mg/kg) Pyrene (0.043-3300 mg/kg) Phenanthrene (NA) Indeno(1,2,3-cd)pyrene (0.016-1500 mg/kg) Naphthalene (0.041-5300 mg/kg) **PCB** Aroclor-1242 Aroclor-1254 Aroclor-1260 Total PCBs (0.086-3.2 mg/kg)

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Determine the possible range of the parameter of interest.	**PESTICIDES** Dieldrin (ND to 0.24 mg/lg)) beta BHC (ND to 0.26 mg/kg) delta-BHC (ND to 0.37 mg/kg)) gamma BHC (ND to 0.49 mg/kg) 4,4-DDE (ND to 0.33 mg/kg)) **METALS** Arsenic (0.0072-3370 mg/kg) Chromium (0.0060-676 mg/kg) Lead (0.1-10800 mg/kg) **OTHER** Ammonia (ND-0.865mg/kg)
	• Define both types of decision errors and their potential consequences and select the baseline condition.	False Rejection Decision Error – The decision maker rejects the null hypothesis when it is really true. False Acceptance Decision Error – The decision maker fails to reject the null hypothesis when it is really false. The results of decision errors could result in a not being protective enough of human health and environmental risk.
	• Specify a range of possible parameter values where the consequences of a false negative decision error are relatively minor (gray region).	Because there are many parameters to be investigated during the data gap-filling RI, the team decided it was not practical to develop statistical plots for each parameter and specific the range of each parameter where consequences of false negative decisions are minor. One reason is that the contamination is fairly well defined by the existing data and that further investigation onto properties off of the Quanta property (former Spencer Kellogg, former Celotex, and Unilever) are in areas where there has been former heavy industrial use and there is the potential for contamination unrelated to the Quanta property.

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Assign probability values to points above and below the action level that reflect the tolerable probability for the occurrence of decision errors.	Because there are many parameters to be investigated during the data gap-filling RI, the specific probability values were not assigned to points above and below the action levels of each parameter. See comments above.
7.	**OPTIMIZE THE DESIGN FOR OBTAINING DATA** (To identify a resource-effective sampling and analysis design for generating data that are expected to satisfy the DQOs)	
	• Review the DQO outputs and existing environmental data.	See steps above.
	• Develop general data collection design alternatives.	The RI is a data-gap-filling investigation; the approach to designing data collection is based on the distribution of existing chemical data for soil. The design alternative for soil data collection includes soil collection from geographically spaced soil borings or monitoring wells within OU1. Based on soil stratigraphy and potential migration pathways in soil, the vertical extent of contamination at each soil boring is to be defined by four vertical soil samples. The vertical sampling design alternative includes the following samples: 1. 0-2 ft (including use for risk assessment purposes, as agreed to in the October 28, 2004 meeting), 2. just above the water table, 3. at a depth selected in the field based on field screening evidence and visual observation, and 4. 2 ft into the clay silt confining unit for vertical delineation.
		Soil sampling in the lower sand unit was considered, however, the current design alternative does not include this as there are no reasonable soil transport mechanisms to convey contaminants to this stratigraphic unit below the clay silt layer (contamination in this zone would be form movement of ground water). Provisions for additional soil borings / sampling for delineation are to be included in the investigation design.

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Formulate the mathematical expressions necessary for each design alternative.	NA - the RI is a data gap filling investigation, contamination in soil will be delineated at the site, and it is not impractical to develop mathematical expressions for the data gap filling design alternative.
	• Select the sample size that satisfies the DQOs for each design alternative.	NA - the RI is a data gap filling investigation, contamination in soil will be delineated at the site.
	• Select the most resource-effective design that satisfies all DQOs.	The most resource effective design is a data gap filling investigation, the approach to designing data collection is based on the distribution of existing chemical data. Soil samples are to be collected from geographically spaced soil borings or monitoring wells within OU1, and four vertical samples are to be collected from each soil boring as follows: 1. 0-2 ft (including use for risk assessment purposes, as agreed to in the October 28, 2004 meeting), 2. just above the water table, 3. at a depth selected in the field based on field screening evidence and visual observation, and 4. 2 ft into the clay silt confining unit for vertical delineation. The subsurface soil samples for chemical analyses will be from a discrete 6-inch interval for volatile organics and a composite of the 2 ft for the remaining chemical parameters. Provisions for additional soil borings / sampling for delineation are to be included in the investigation design.

Table 1-1
Data Quality Objectives (DQO)s for the Investigation of Soil
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Document the operational details and theoretical assumptions of the selected design in the Quality Assurance Project Plan (QAPP).	The operational requirements for implementing the soil data collection design are documented in the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP). The design elements in these documents includes the following: • Sample size, • Sample type, • General collection techniques (split-spoon sampling), • Sample support, • Sample locations, • Timing issues for sample collection, • Analytical methods, and • QA / QC protocols.

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
1	**STATE THE PROBLEM** (Summarize the contamination problem that will require new environmental data, and identify the resources available to resolve the problem)	
	• Identify members of the planning team.	The site manger for the Quanta Resources Site is Tim Metcalf of Honeywell. The regulatory agency in charge is the USEPA (Richard Ho is the USEPA Project Manager). The technical staff includes the following Parsons personnel: • Paul Feshbach-Meriney – Technical Project Manager and Hydrogeologist • James Goldrick – Geologist • Chunhua Liu – Human Health and Ecological Risk Assessor / Quality Assurance • Karen Field – Ecological Risk Assessor • Chunhua Liu – Human Health Assessor • Chunhua Liu – QA Specialist The stakeholders include the Quanta Site Assessment Group (QSAG), the State of New Jersey, and local residents.
	• Develop/refine the conceptual site model.	A Conceptual Site Model (CSM) has been developed for the Quanta Resources Site, based on approximately 30 ground water samples that have been collected during previous investigations at the site. The CSM is presented in Figure 1-1 and Section 4.1 of the RI/FS Work Plan.

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Define the exposure scenarios.	Humans (Construction Worker Scenario) or sensitive ecosystems may be exposed to ground water in the unconfined overburden (fill). Based on historical site use, analytical data, and previous site reports the potential contaminants of concern include LNAPL, DNAPL, VOCs, SVOC, PCBs, arsenic, and lead. Currently, the Quanta Site is vacant (See Section 2.1 of the WP). Future land use has not been yet been determined, however, it may include residential, commercial, or recreational use. Determine ARARs Develop risk based contaminant –specific goals (PRGs). ID toxicity values for all COCs
	• Specify the available resources and constraints.	The approximate monetary budget for data collection (include developing DQOs, constructing QAPP, sampling, chem.. analysis, data handling and interpretation will be developed when cost estimates are obtained from the contract laboratory prior to implementation of the Work Plan. Paul Feshbach-Meriney will be the project manager and will use Parsons employees from the Boston, Massachusetts, Somerset, New Jersey Office, and local subcontractors as necessary. Field equipment (including vehicles) will be purchased or rented as needed. There are existing monitoring wells on the former Celotex property (according to recent reports and the NJDEP Project Manager for the Celotex Site) that are planned to be used for the RI investigation of OU1.

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
		However, the recent development of this area the status of these wells is uncertain. It was NJDEP's intent that these wells be available for future sampling. While there are existing ground water analytical data from the former Celotex property that will be used to fill in data gaps for the Quanta RI, the recent placement of fill and redevelopment of this property will make collecting installing additional monitoring wells for ground water samples difficult (if required after analysis of the RI data). Time constraints for completing the required site evaluation include the availability of licensed well drillers and equipment, weather, and regulatory and public review of documents.
	• Write a brief summary of the contamination problem.	A review of historical data from the site indicates potential impacts to soil and ground water from VOCs, SVOCs, PCBs, pesticides, arsenic, chromium (total), hexavalent chromium, and lead. NAPL (DNAPL and LNAPL) from historical release have migrated to the subsurface soils and ground water zone, and has migrated to the bulkhead near the Hudson River. Dissolved constituents in ground water have migrated toward commercial building (115 River Road) and may have impacted indoor air quality.
2	**IDENTIFY THE DECISION** (To identify the decision that requires new environmental data to address the contamination problem)	
	• Identify the principle study question.	Where do the ground water contaminant concentrations exceed the corresponding ARARs or PRGs for the Site? Contaminant concentrations in ground water exceed ARARs or PRGs in the upper (fill and silty sand) ground water zone for the following constituents: • LNAPL and DNAPL, and • Dissolved petroleum constituents (VOCs and SVOCs), PCBs, arsenic, and lead.

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Define the alternative actions that could result from the resolution of the principle study question.	Alternative actions would be to delineate ground water until below ARARs or PRGs for the site or initiate response actions. Alternatively, because the Site has a history of heavy industrial use, it may not be practical to delineate to below ARARs. In this case, the combination of reference ground water sample results from off property areas may be used to provide information to determine that the site characterization is complete (e.g., in the instance of commingled dissolved phase plumes). In order to determine if ground water poses a potential threat to human health or the environment or that it poses a unacceptable risk to human health or the environment the RI team may make the following Advanced Assessment Evaluations: (i) No further action is necessary (ii) Collect additional data (iii) Recommend a possible response action
	• Combine the principle study question and the alternative actions into a decision statement.	Determine where ground water contamination exceeds ARARs or PRGs for the Site and require further delineation, where response actions are necessary, or where no further action is required.
	• Organize multiple decisions.	Several decisions will be needed to address contamination at the site. Does contamination in the ground water pose a threat to human health or the environment? Several media including surface soil, groundwater, and indoor air will need to be evaluated prior to making final decisions. In addition, decisions on the type of technology to use and the feasibility of implementing certain actions.

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
3	**IDENTIFY THE INPUTS TO THE DECISION** (To identify the information that will be required to support the decision and specify which inputs require new environmental measurements)	
	• Identify the information that will be required to resolve the decision statement.	A combination of sampling and modeling will be used to determine if ground water contamination exceeds the ARARs or PRGs or if the contamination poses a risk to human health and the environment. Previous investigations indicate that NAPL (DNAPL and LNAPL) VOCs, SVOCs, PCBs, arsenic, hexavalent chromium, chromium (total), and lead need to be further investigated (see Step 6 for concentration ranges). Also, the presence or absence of pesticides in ground water needs to be determined. Based on ground water analytical data collected during previous investigations (e.g., RSI Report, GeoSyntic 2000) there are data gaps in the characterization of ground water contamination that need to be filled in. The data indicates that further investigation of unconfined overburden aquifer (fill and sand), the deep sand aquifer is necessary for LNAPL, DNAPL, VOCs, SVOCS, PCBs, arsenic and lead. There is a potential that the bedrock ground water zone will need to be investigated, but this is dependent on the outcome of analyses of the lower sand unit. The anticipated analytical methods to be used include VOCs (OLM04.3), SVOCs (OLM04.3), PCBs (OLM04.3), Pesticides (OLM04.3), specific inorganics or TAL Metals (ILM05.2), hexavalent chromium (visible spectrophotometry (SW-846 Method 7196A). The presence of NAPL in monitoring wells will be performed using an oil / water interface probe. Accutest Labs was consulted for analytical method information and performance.

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Determine the sources for each item of information identified.	The sources (i.e., previous reports, USEPA and NJDEP guidance, USGS guidance and figures, ASTM standards) that will be used to resolve the decision statement are referenced in Section 2 of the OU1 Work Plan.
	• Identify the information needed to establish the action level.	Action levels will be developed using the residential scenario and USEPA MCLs, New Jersey MCLs, and Region 9 PRGs for ground water.
	• Confirm that appropriate analytical methods exist to provide the necessary data.	Ground water samples will be sent to a NELAP approved laboratory. The analytical methods to be used for chemical analyses of ground water to provide the necessary data were confirmed with the laboratory (Accutest) and they are as follows: VOCs (OLM04.3), SVOCs (OLM04.3), PCBs (OLM04.3), Pesticides (OLM04.3), specific inorganics or TAL Metals (ILM05.2), hexavalent chromium (visible spectrophotometry (SW-846 Method 7196A). The presence of NAPL in the wells will be determined using an oil water interface probe. Occasionally, it may not be possible to achieve the requested sample or detection limits due to the following: 1.) Diluted samples, 2.) Low percent solids, 3.) Matrix interference, or 4.) Poor QA/QC results.
4	**DEFINE THE BOUNDARIES OF THE STUDY** (To define the spatial and temporal boundaries that the data must represent to support the decision)	
	• Specify the characteristics that define the population of interest.	Previous investigations indicate that ground water is contaminated by DNAPL, NAPL, VOCs, SVOCs, arsenic, and lead. Pesticides and PCBs are also included in the population of interest. Therefore, the population of interest for ground water includes the parameters that occur within the operable unit one (OU1).

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Define the geographic area to which the decision statement applies.	The Quanta Resources site is located at 163 River Road in Edgewater, Bergen County, New Jersey. The property is bordered to the north by the former Celotex and Lustrelon properties, to the south by the former Spencer Kellogg property. The Hudson River borders to the east and River Road to the west. The Quanta Resources Site is divided into two operable units OU1 (the upland portion) and (OU2 the Hudson River portion). The geographic area to which the decision applies includes OU1 of the Quanta Resources Superfund Site.
	• When appropriate, divide the population into strata that have relatively homogenous characteristics.	The investigation will include ground water from the water table to the lower sand unit that occurs below the clay silt/clay clay unit and above the bedrock surface (~50 feet below ground surface). Multiple ground water zones (shallow unconfined vs. deep confined) are included in the population of interest. The population does not currently include bedrock, as the conceptual model does not indicate that it is likely that this zone would be impacted by Site contaminants. However, a provision to investigate bedrock should be provided for in the Work Plan.
	• Determine the time frame to which the decision applies.	All of the primary sources (e.g., above ground storage tanks, underground storage tanks, oil water separators) have been removed from the Quanta property, the study data will conservatively reflect the condition of contaminants present in the ground water over a period of 50 years. Therefore, ground water sampling results collected as part of this RI would represent worse case (i.e., conservative) impacts to human health and the environment.
	• Determine when to collect data.	Ground water at OU1 will be sampled quarterly during the RI to determine if there are significant seasonal fluctuations in the concentrations of contaminants in ground water concentrations in the ground water zones. After four quarters of sample collection for the RI, it may be possible to reduce the sampling frequency as part of a monitoring program.

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Define the scale of decision-making.	Given the location of OU1 and the considerable development that has occurred to the north and south of the Quanta property, the planning team choose to base the decision making for ground water on the Quanta property, as this is currently the undeveloped portion of OU1. It also likely that the Quanta property will be developed as one development project.
	• Identify any practical constraints on data collection.	Potential constraints or obstacles on implementing the field sampling plan for ground water may including the following: • Unsafe conditions, • Weather (Lighting, snow, ice, extreme temperatures), • Access to adjacent properties, • Obstacles (above/underground utilities, site operations), or • Equipment failure/malfunction. If further investigation of OU1 north of the Quanta property is required after the completion of sampling activities defined in the Work Plan, the recent placement of fill and boulders (up to ~20 feet) on the former Celotex property and the redevelopment of the former Celotex property will hamper well installation and ground water sampling in this area.
5	**DEVELOP A DECISION RULE** (Develop a logical "If...then..." statement that defines the conditions that would cause the decision maker to choose among alternative actions.	
	• Specify the statistical parameter (such as mean, median, maximum, or proportion) that characterizes the population of interest.	For NAPL, the presence or absence of NAPL will the statistical parameter of interest. For contaminants dissolved in ground water, the scale that characterizes the population will be influenced background comparisons and applicable standards.

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
		This would require the following statistical parameters: • Maximum • Average • Regulatory limits The 95th percentile is also a parameter of interest in ground water within OU1.
	• Specify the action level for the decision.	The action level for NAPL shall be a measurement of greater than 0.01 ft, which is the detection limit for an oil / water interface probe. For other contaminants in ground water, Action levels will be developed using the residential scenario and USEPA MCLs, New Jersey MCLs, and Region 9 PRGs for ground water.
	• Confirm that measurement detection limits will allow reliable comparisons with action level.	Honeywell and the laboratory will establish agreed upon contract required quanitation limits prior to the collection of samples to ensure that the quantitation limits meet the ARARs. In some instances the analytical methods may need to be modified by the laboratory to meet specific ARAR parameters. For NAPL, the oil / water interface probe will record (sound an audible alarm) NAPL thickness of 0.01ft or greater.
	• Combine the outputs from the previous DQO steps and develop a decision rule.	If dissolved contaminants are detected in the ground water in excess of the ARARs for OU1, then further delineation is required; otherwise no further evaluation is necessary. If NAPL is detected greater than 0.01ft, then NAPL will be delineated to less than 0.01 feet. However, consideration will be given to the former heavy industrial use of the surrounding area and the presence of contaminants from industrial operations at other properties that were unrelated to operations at the Quanta property.

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
6.	**SPECIFY TOLERABLE LIMITS ON DECISION ERRORS** (To specify the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data)	
	• Determine the possible range of the parameter of interest.	**VOC** Benzene (0.90 to 14,000 ug/L) Ethylbenzene (0.7 to 1,100 ug/L) Toluene (0.40 to 6,100 ug/L) Xylene (3.0 to 5,000 ug/L) **SVOC** Phenol (3.9 to 12,000 ug/L) 1,2,4-Trichlorobenzene 1,3-Dichlorobenzene (1,4-Dichlorobenzene 2,4-Dimethylphenol (10 to 19,000 ug/L) 4-Methylphenol (5.7 to 32,000 ug/L) 2-Methylphenol (8.1 to 16,000 ug/L) bis(2-Ethylhexyl)phthalate butylbenzylphthalate Styrene (860 to 1,2000 ug/L) 2-Methylnaphthalene (1.1 to 4,200 ug/L) Carbazole (11 to 140 ug/L) Dibenzofuran (9.5 to 130 ug/L) **PAH** Naphthalene (6 to 23,000 ug/L) Acenaphthene (5.6 to 870 ug/L) Acenaphthylene (2.4 to 520 ug/L) Anthracene (3.5 to 510 ug/L) Benzo(a)anthracene (0.9 to 350 ug/L) Benzo(a)pyrene (3.4 to 200 ug/L) Benzo(b)fluoranthene (4.0 to 200 ug/L)

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Determine the possible range of the parameter of interest (Continued).	**PAH** Benzo(g,h,i)perylene (0.1 to 93 ug/L) Benzo(k)fluoranthene (0.1 to 74 ug/L) Chrysene (5.8 to 260 ug/L) Dibenzo(a,h)anthracene (0.1 to 43 ug/L)Pyrene (2.3 to 830 ug/L) Phenanthrene (2.4 to 2,300 ug/L) Fluorene (2.4 to 946 ug/L) Fluoranthene (0.7 to 950 ug/L) Indeno(1,2,3-cd)pyrene (0.1 to 84 ug/L) **Metals** Arsenic (13.4 to 20,900 ug/L) Chromium (Total) (3.2 to 33.9 ug/L) Lead (2.6 to 58.5 ug/L) **NAPL** (<0.01 to several feet)
	• Define both types of decision errors and their potential consequences and select the baseline condition.	False Rejection Decision Error – The decision maker rejects the null hypothesis when it is really true. Ground water sampling locations may be away from areas of high concentration and ground water concentrations may not be representative (to low) of site conditions. The consequences of this error may under estimate the risk to human health and the environment. False Acceptance Decision Error – The decision maker fails to reject the null hypothesis when it is really false. If a ground water sampling locations is in an area of high concentration, ground water concentrations may be unusually high for the site. The consequences of this error may overestimate the risk to human health and the environment.

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Specify a range of possible parameter values where the consequences of a false negative decision error are relatively minor (gray region).	Because there are many parameters to be investigated during the data gap-filling RI, the team decided it was not practical to develop statistical plots for each parameter and specific the range of each parameter where consequences of false negative decisions are minor. One reason is that the contamination is fairly well defined by the existing data and that further investigation onto properties off of the Quanta property (former Spencer Kellogg, former Celotex, and Unilever) are in areas where there has been former heavy industrial use and there is the potential for contamination unrelated to the Quanta property. Also, because this is a data gap-filling- investigation, there is a high probability that the samples will fall within the gray region. The gray region is based on EPA Region 2 Data Validation SOPs. Aqueous results are expected to be in the gray area when they are inside 5% of the MCL. For example: benzene (MCL=5 ug/L) Gray Region (2.5 to 7.5 ug/L).
	• Assign probability values to points above and below the action level that reflect the tolerable probability for the occurrence of decision errors.	Because there are many parameters to be investigated during the data gap-filling RI, the specific probability values were not assigned to points above and below the action levels of each parameter. In general, when the sample result is closest to the action level then the probability is highest for decision errors to occur.
7.	**OPTIMIZE THE DESIGN FOR OBTAINING DATA** (To identify a resource-effective sampling and analysis design for generating data that are expected to satisfy the DQOs)	
	• Review the DQO outputs and existing environmental data.	See Steps above.
	• Develop general data collection design alternatives.	The RI is a data-gap-filling investigation and the approach to designing data collection for ground water is based on the distribution of existing chemical data for ground water. The design alternative for ground water data collection includes collection of ground water data from geographically spaced monitoring wells within OU1. Based on Site stratigraphy and potential contaminant migration pathways, no more than 10 feet of screen will be used to investigation ground water. Also, because low flow purge and sampling methods are to be used, as

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
		an initial step, the vertical distribution of contaminant in each well will be determined for five foot intervals in each well. After this initial vertical sampling, the number of samples per well may be revised.
	• Formulate the mathematical expressions necessary for each design alternative.	NA - the RI is a data gap filling investigation, contamination in ground water will be delineated at the site, and it is not impractical to develop mathematical expressions for the data gap filling design alternative.
	• Select the sample size that satisfies the DQOs for each design alternative.	NA - the RI is a data gap filling investigation, contamination in ground water will be delineated at the site.
	• Select the most resource-effective design that satisfies all DQOs.	The most resource effective design is a data gap filling investigation. The approach to designing data collection is based on the distribution of existing ground water chemical data. Ground water samples are to be collected from geographically spaced monitoring wells within OU1. Screen intervals for each well are to be no more than 10 feet long. Initially, the vertical distribution of contaminant in each well will be determined for five foot intervals in each well using low flow purge and sampling methods. After this initial vertical sampling, the number of samples per well may be revised. Ground water at OU1 will be sampled quarterly during the RI to determine if there are significant seasonal fluctuations in the concentrations of contaminants in ground water concentrations in the ground water zones. After four quarters of sample collection for the RI, it may be possible to reduce the sampling frequency as part of a monitoring program. Provisions for additional monitoring wells and ground water sampling for delineation are to be included in the investigation design.

Table 1-2
Data Quality Objectives (DQO)s for the Investigation of Ground Water
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Document the operational details and theoretical assumptions of the selected design in the Quality Assurance Project Plan (QAPP).	The operational requirements for implementing the ground water data collection design are documented in the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP). The design elements in these documents includes the following: • Sample size, • Sample type, • General collection techniques (split-spoon sampling), • Sample support, • Sample locations, • Timing issues for sample collection, • Analytical methods, and • QA / QC protocols.

Table 1-3
Data Quality Objectives (DQO)s for the Investigation of Hydrology
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
1	**STATE THE PROBLEM** (Summarize the contamination problem that will require new environmental data, and identify the resources available to resolve the problem)	
	• Identify members of the planning team.	The site manger for the Quanta Resources Site is Tim Metcalf of Honeywell. The regulatory agency in charge is the USEPA (Richard Ho is the USEPA Project Manager). The technical staff includes the following Parsons personnel: • Paul Feshbach-Meriney – Technical Project Manager and Hydrogeologist • James Goldrick – Geologist • Chunhua Liu – Human Health and Ecological Risk Assessor / Quality Assurance • Chunhua Liu – Human Health Assessor • Chunhua Liu – QA Specialist The stakeholders include the Quanta Site Assessment Group (QSAG), the State of New Jersey, and local residents.
	• Develop/refine the conceptual site model.	A Conceptual Site Model (CSM) has been developed for the Quanta Resources Site, based on previous investigations at the site. The hydrostratigraphic zones that exists on the site are as follows: 1. Unconfined ground water zone (fill, sand / silty sand), 2. Aquitard (clay silt / silty clay), 3. Confined ground water zone (lower sand), and 4. Bedrock ground water zone. The CSM is presented in Figure 1-1 of the QAPP and Section 4.1 of the RI/FS Work Plan.
	• Define the exposure scenarios.	NA

Table 1-3
Data Quality Objectives (DQO)s for the Investigation of Hydrology
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Specify the available resources and constraints.	The approximate monetary budget for data collection (include developing DQOs, constructing QAPP, hydrologic testing, analysis, data handling and interpretation will be developed when cost estimates are obtained from the vendors prior to implementation of the Work Plan. Paul Feshbach-Meriney will be the project manager and will use Parsons employees from the Boston, Massachusetts, Somerset, New Jersey Office, and local subcontractors as necessary. Field equipment (including vehicles) will be purchased or rented as needed. While there are existing hydrological data from the former Celotex property that will be used to fill in data gaps for the Quanta RI, the recent placement of fill and redevelopment of this property will make collecting additional hydrologic data difficult (if required after analysis of the RI data). Time constraints for completing the required site evaluation include the availability of licensed well drillers and equipment, weather, and regulatory and public review of documents.
	• Write a brief summary of the contamination problem.	A review of historical data for the site indicates potential impacts to ground water including LNAPL, DNAPL, dissolved petroleum constituents, and arsenic and lead. The project personnel under the leadership of Tim Metcalf and Paul Feshbach-Meriney will develop a Remedial Investigation (RI) Work Plan, carry out the RI, and present a RI Completion Report.

Table 1-3
Data Quality Objectives (DQO)s for the Investigation of Hydrology
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
2	**IDENTIFY THE DECISION** (To identify the decision that requires new environmental data to address the contamination problem)	
	• Identify the principle study question.	Establish ground water flow direction, horizontal and vertical gradients, horizontal and vertical velocities, tidal affects on unconfined and confined ground water flow systems.
	• Define the alternative actions that could result from the resolution of the principle study question.	One alternative may be to investigate new areas for ground water chemistry based on the new information on ground water flow directions or gradients. Another alternative to conduct additional hydrogeological investigations based on new data.
	• Combine the principle study question and the alternative actions into a decision statement.	Determine when hydrological characterization of the ground water zones has been completed for the purposes of delineation of chemicals in ground water and soil.
	• Organize multiple decisions.	Site hydrology will be used in conjunction with chemical data to determine where ground water contamination exceeds ARARs or PRGs or is a risk to human health or the environment.
3	**IDENTIFY THE INPUTS TO THE DECISION** (To identify the information that will be required to support the decision and specify which inputs require new environmental measurements)	
	• Identify the information that will be required to resolve the decision statement.	This includes determination of hydraulic conductivity in ground water zones, depth to ground water and NAPL to construction ground water elevation contour maps, calculation of horizontal and vertical gradients and determining flow direction.
	• Determine the sources for each item of information identified.	The sources (i.e., previous reports, USEPA and NJDEP guidance, USGS guidance and figures, ASTM standards) that will be used to resolve the decision statement are referenced in Section 2 of the OU1 Work Plan.
	• Identify the information needed to establish the action level.	NA

Table 1-3
Data Quality Objectives (DQO)s for the Investigation of Hydrology
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Confirm that appropriate analytical methods exist to provide the necessary data.	Appropriate methods will be used to collect the required hydrologic data. These methods for depth to water measurements, slug testing, and estimate of mean hydraulic gradient in a tidal environment are published in peer reviewed journals and available from United State Geological Survey, USEPA and NJDEP sources. Instrumentation to provide these data exists (e.g., water level meter, transducer, data logger etc.)
4	**DEFINE THE BOUNDARIES OF THE STUDY** (To define the spatial and temporal boundaries that the data must represent to support the decision)	
	• Specify the characteristics that define the population of interest.	Hydrologic data will be used to further characterize LNAPL, DNAPL, VOCs, SVOCs, PCBs, arsenic, and lead in the ground water and to further investigated their impacts on human health and the environment.
	• Define the geographic area to which the decision statement applies.	The Quanta Resources site is located at 163 River Road in Edgewater, Bergen County, New Jersey. The property is bordered to the north by the former Celotex and Lustrelon properties, to the south by the former Spencer Kellogg property. The Hudson River borders to the east and River Road to the west. The Quanta Resources Site is divided into two operable units OU1 (the upland portion) and (OU2 the Hudson River portion). The geographic area to which the decision applies includes OU1 of the Quanta Resources Superfund Site.
	• When appropriate, divide the population into strata that have relatively homogenous characteristics.	The investigation will include ground water from the water table to the lower sand unit that occurs below the clay silt/clay clay unit and above the bedrock surface (~50 feet below ground surface). Multiple ground water zones (shallow unconfined vs. deep confined) are included in the population of interest. The population does not currently include bedrock, as the conceptual model does not indicate that it is likely that this zone would be impacted by Site contaminants. However, a provision to investigate bedrock should be provided for in the Work Plan.

Table 1-3
Data Quality Objectives (DQO)s for the Investigation of Hydrology
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Determine the time frame to which the decision applies.	The study data will conservatively reflect the condition of contaminants present in the ground water over a period of 50 years, provided no significant water withdrawal sources are installed that influence the site hydrogeology..
	• Determine when to collect data.	There are no constraints as to when to run these hydrological tests, other than being aware of tidal cycles (using tidal charts) and performing the tests according the published methods. A synoptic round of depth to ground water or NAPL measurements should be made in each well prior to each of the four quarterly sampling events.
	• Define the scale of decision-making.	The planning team chooses to base the decision making for hydrological information on the OU1 Site.
	• Identify any practical constraints on data collection.	Potential constraints or obstacles on implementing the field sampling plan for hydrological investigations may including the following: • Unsafe conditions • Weather (Lighting, snow, ice, extreme temperatures), • Access to adjacent properties, • Obstacles (above/underground utilities, site operations), or Equipment failure/malfunction.
5	**DEVELOP A DECISION RULE** (Develop a logical "If...then..." statement that defines the conditions that would cause the decision maker to choose among alternative actions.	
	• Specify the statistical parameter (such as mean, median, maximum, or proportion) that characterizes the population of interest.	In general, the results of the hydrologic investigation will be as individual data. The average may be used to characterize the site or portions of the site overall.
	• Specify the action level for the decision.	For the majority of the hydrologic data (hydraulic conductivity, elevation, or gradient) collected at the site, no action levels are applicable. This data will be used in conjunction with ground water analytical data to further characterize the site. The action level for NAPL detected in monitoring wells (relative to additional delineation) will be 0.01 ft.

Table 1-3
Data Quality Objectives (DQO)s for the Investigation of Hydrology
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Confirm that measurement detection limits will allow reliable comparisons with action level.	An ORS oil/water interface probe will record NAPL thickness of greater than or equal to 0.01 ft.
	• Combine the outputs from the previous DQO steps and develop a decision rule.	If NAPL thickness is detected greater than 0.01 ft, then the NAPL shall be further characterized, monitored, and delineated. If ground water flow information (direction) indicates an area may be affected by contamination, but is not being investigated, additional ground water samples would be included.
6.	**SPECIFY TOLERABLE LIMITS ON DECISION ERRORS** (To specify the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data)	
	• Determine the possible range of the parameter of interest.	Hydraulic conductivity Hydraulic gradient Ground water elevations NAPL thickness
	• Define both types of decision errors and their potential consequences and select the baseline condition.	NA
	• Specify a range of possible parameter values where the consequences of a false negative decision error are relatively minor (gray region).	NA
	• Assign probability values to points above and below the action level that reflect the tolerable probability for the occurrence of decision errors.	NA
7.	**OPTIMIZE THE DESIGN FOR OBTAINING DATA** (To identify a resource-effective sampling and analysis design for generating data that are expected to satisfy the DQOs)	
	• Review the DQO outputs and existing environmental data.	See steps above.

Table 1-3
Data Quality Objectives (DQO)s for the Investigation of Hydrology
Quanta Resources Site
Edgewater, New Jersey

STEP	THE DQO PROCESS	RESPONSE
	• Develop general data collection design alternatives.	The investigation will include ground water from the water table to the lower sand unit that occurs below the clay silt/clay clay unit and above the bedrock surface (~50 feet below ground surface). Multiple ground water zones (shallow unconfined vs. deep confined) are included in the population of interest. The population does not currently include bedrock, as the conceptual model does not indicate that it is likely that this zone would be impacted by Site contaminants. However, a provision to investigate bedrock should be provided for in the Work Plan. The field testing will include the following: • Water level measurements, • Slug testing, and • Determination of average hydraulic gradient. There are no constraints as to when to run these hydrological tests, other than being aware of tidal cycles (using tidal charts) and performing the tests according the published methods. A synoptic round of depth to ground water or NAPL measurements should be made in each well prior to each of the four quarterly sampling events.
	• Formulate the mathematical expressions necessary for each design alternative.	NA
	• Select the sample size that satisfies the DQOs for each design alternative.	NA
	• Select the most resource-effective design that satisfies all DQOs.	The most resource effective design is a data gap filling investigation. The approach to designing data collection is based on the distribution of existing hydrological data.
	• Document the operational details and theoretical assumptions of the selected design in the Quality Assurance Project Plan (QAPP).	The operational requirements for implementing the hydrological data collection design are documented in the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP).

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

STEP #	THE DQO PROCESS	RESPONSE
1	**STATE THE PROBLEM** (Summarize the contamination problem that will require new environmental data, and identify the resources available to resolve the problem)	
	• Identify members of the planning team.	The site manger for the Quanta Resources Site is Tim Metcalf of Honeywell. The regulatory agency in charge is the USEPA (Richard Ho is the USEPA Project Manager). The technical staff includes the following Parsons personnel: • Paul Feshbach-Meriney – Technical Project Manager and Hydrogeologist • James Goldrick – Geologist • Chunhua Liu – Human Health and Ecological Risk Assessor / Quality Assurance Note that the evaluation of indoor air at the 115 River Road commercial building will be conducted by EWMA in accordance with their work plan titled, Vapor Intrusion Investigation Work Plan for 3Y LLC Development, April 13, 2005. The EWMA work plan provides details on field and analytical methods to be used. The stakeholders include the Quanta Site Assessment Group (QSAG), the State of New Jersey, and local residents.

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

	• Develop/refine the conceptual site model.	A Conceptual Site Model (CSM) has been developed for the Quanta Resources Site, based on previous investigations at the site. The CSM is presented in Figure 1-1 of the QAPP and Section 4.1 of the RI/FS Work Plan.
	• Define the exposure scenarios.	Any potential residential, worker, or recreational users at the Site (specifically the users at the 115 River Road commercial building) have a possibility to be exposed to VOCs in indoor air by way of volatilization from subsurface dissolved-phase ground water plumes, and possibly from volatilization from NAPL in the subsurface.
	• Specify the available resources and constraints.	The approximate monetary budget for data collection (include developing DQOs, constructing QAPP, sampling, chem. analysis, data handling and interpretation will be developed when cost estimates are obtained from the contract laboratory. The work is to be completed by EWMA staff in accordance with the work plan. Field equipment (including vehicles) will be purchased or rented as needed by EWMA. Time constraints for completing the required site evaluation include the availability of equipment, weather, access agreements, and regulatory and public review of documents. It will be important to obtain indoor air samples from various times of the year, including one round during the winter months, which typically represents a worst-case scenario for indoor air.

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

	• Write a brief summary of the contamination problem.	A review of historical data from the site indicates potential impacts to soil and ground water from VOCs, SVOCs, PCBs, pesticides, arsenic, chromium (total), hexavalent chromium, and lead. NAPL (DNAPL and LNAPL) from historical release have migrated to the subsurface soils and ground water zone, and has migrated to the bulkhead near the Hudson River. Dissolved constituents in ground water have migrated toward a commercial building (115 River Road) and may have impacted indoor air quality.
2	**IDENTIFY THE DECISION** (To identify the decision that requires new environmental data to address the contamination problem)	
	• Identify the principle study question.	Do VOCs (attributable to the dissolved phase plumes or NAPL in the subsurface from the Quanta property) in indoor air at 115 River Road pose an unacceptable risk to human health and the environment?

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

	• Define the alternative actions that could result from the resolution of the principle study question.	Alternative actions would be to determine that indoor air concentrations of VOCs are below ARARs or PRGs in the building at 115 River Road or determine that they are above the ARARs or PRGs and potentially initiate response actions. However, it is important to consider any response actions in the context of the ambient air sampling results. The combination of ambient air sampling results and practical transport pathways for indoor air may be used to provide information to determine the impact from VOC dissolved phase plumes or NAPL on indoor air quality. In order to determine if indoor air at 115 River Road poses a potential threat to human health or the environment or that it poses a unacceptable risk to human health or the environment, the RI team may make the following Advanced Assessment Evaluations: (i) No further action is necessary (ii) Collect additional data (iii) Recommend a possible response action
	• Combine the principle study question and the alternative actions into a decision statement.	Determine where indoor air concentrations of VOCs exceed ARARs or PRGs for the site and require further delineation, where response actions are necessary, or where no further action is required.

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

	• Organize multiple decisions.	Several decisions will be needed to address the potential for indoor air impacts at 115 River Road building. Have VOCs concentrations in indoor air been property characterized within the building? Do indoor air concentrations of VOCs (attributable to the dissolved phase plumes or NAPL in the subsurface from the Quanta property) pose a threat to human health or the environment? Several media including surface soil and groundwater will need to be evaluated prior to making final decisions on a site wide basis. In addition, decisions on the type of technology to use and the feasibility of implementing certain actions will be needed.
3	**IDENTIFY THE INPUTS TO THE DECISION** (To identify the information that will be required to support the decision and specify which inputs require new environmental measurements)	
	• Identify the information that will be required to resolve the decision statement.	Sampling will be used to determine if indoor air concentrations of VOCs exceed the ARARs or PRGs or if the VOCs poses a risk to human health and the environment. Previous investigations indicate that dissolved-phase plumes of VOCs, and potentially NAPL, have migrated beneath the building at 115 River Road. The anticipated analytical method to be used to determine the concentrations of VOCs in air is EPA Method TO-15. Severn Trent Labs was consulted by EWMA for analytical method information and performance. In addition, the results of the ambient air sample and building inventory will be used to evaluate the significance of the indoor air results.

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

	• Determine the sources for each item of information identified.	The sources (i.e., previous reports, USEPA and NJDEP guidance, USGS guidance and figures, ASTM standards) that will be used to resolve the decision statement are referenced in Section 2 of the OU1 Work Plan. The field program will provide updated indoor air quality results for VOCs.
	• Identify the information needed to establish the action level.	Action levels are based on the use of the building space by the occupants (e.g., commercial office space, day care center). Action levels will be determined based on an evaluation of OSWER Generic Screening Levels (for soil gas) and EPA Region 3 Risk Based Concentrations for ambient air (for indoor air). However, any action will be based on consideration of ambient air sampling results and building inventory information.
	• Confirm that appropriate analytical methods exist to provide the necessary data.	EPA Method TO-15 PQL/MDL based on sample collection in Summa® canister.
4	**DEFINE THE BOUNDARIES OF THE STUDY** (To define the spatial and temporal boundaries that the data must represent to support the decision)	
	• Specify the characteristics that define the population of interest.	Previous investigations indicate that ground water and soil is contaminated by DNAPL, NAPL, VOCs, SVOCs, PCBs, arsenic, chromium (total), possibly hexavalent chromium, and lead. However, the population of interest for indoor air is VOCs that may have migrated from dissolved phase plumes and or NAPL in the subsurface into building at 115 River Road within the operable unit one (OU1).

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

	• Define the geographic area to which the decision statement applies.	The Quanta Resources site is located at 163 River Road in Edgewater, Bergen County, New Jersey. The property is bordered to the north by the former Celotex and Lustrelon properties, to the south by the former Spencer Kellogg property. The Hudson River borders to the east and River Road to the west. The Quanta Resources Site is divided into two operable units OU1 (the upland portion) and (OU2 the Hudson River portion). The geographic area to which the decision applies includes the building at 115 River Road within OU1 of the Quanta Resources Superfund Site.
	• When appropriate, divide the population into strata that have relatively homogenous characteristics.	It is not appropriate to divide the population of interest into strata.
	• Determine the time frame to which the decision applies.	All of the primary sources (e.g., above ground storage tanks, underground storage tanks, oil water separators) have been removed from the Quanta property. While indoor air concentrations of VOCs can be dynamic, provided that there are seasonal indoor air results from the proposed investigation and there are no significant changes in the ventilation system at 115 River Road, the study data will conservatively reflect the condition of VOCs present in the indoor air over a period of approximately 5 years (until the sources are remedied on the OU1 portion of the Site.
	• Determine when to collect data.	Indoor air samples should be collected during different seasons, including one sampling round during the winter months, which represents a worst-case condition for indoor air sampling.
	• Define the scale of decision-making.	Given the location of the building at 115 River Road, the planning team chooses to base the decision making for indoor air on the 115 River Road, as this is the focus of the indoor air investigation within OU1.

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

	• Identify any practical constraints on data collection.	Potential constraints or obstacles on implementing the field sampling plan for indoor air may including the following: • Unsafe conditions, • Weather (Lighting, snow, ice, extreme temperatures) for ambient air samples, • Access to offices within the building, • Obstacles (above/underground utilities, site operations), or • Equipment failure/malfunction.
5	**DEVELOP A DECISION RULE** (Develop a logical "If…then…" statement that defines the conditions that would cause the decision maker to choose among alternative actions.	
	• Specify the statistical parameter (such as mean, median, maximum, or proportion) that characterizes the population of interest.	The scale that characterizes the population will be influenced by hot spots, comparison to ambient air concentrations, and applicable standards. The population of interest is represented by the individual analytical results and not by any statistical parameter.
	• Specify the action level for the decision.	Action levels will be determined based on an evaluation of OSWER Generic Screening Levels (for soil gas) and EPA Region 3 Risk Based Concentrations for ambient air (for indoor air). However, any action will be based on consideration of ambient air sampling results and building inventory information.
	• Confirm that measurement detection limits will allow reliable comparisons with action level.	EWMA and the laboratory will establish agreed upon contract required quantitation limits prior to the collection of samples. In some instances the laboratory will need to report the PQL or instrument detection limit to meet specific ARAR parameters.

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

	• Combine the outputs from the previous DQO steps and develop a decision rule.	If VOC contaminants are detected in the indoor air at the 115 River Road building in excess of the ARARs, then further investigation is required and potentially remedial action; otherwise no further evaluation is necessary. However, consideration will be given to the results of ambient air concentrations and the results of the building inspection, as indoor air concentrations may be measured that are unrelated to the dissolved-phase (VOC) ground water plumes and NAPL beneath the ground surface at OU1.
6.	**SPECIFY TOLERABLE LIMITS ON DECISION ERRORS** (To specify the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data)	
	• Determine the possible range of the parameter of interest.	The possible range of VOCs in indoor air at the 115 River Road building is not known at this time.
	• Define both types of decision errors and their potential consequences and select the baseline condition.	False Rejection Decision Error – The decision maker rejects the null hypothesis when it is really true. False Acceptance Decision Error – The decision maker fails to reject the null hypothesis when it is really false. The results of decision errors could result in a not being protective enough of human health
	• Specify a range of possible parameter values where the consequences of a false negative decision error are relatively minor (gray region).	Development of a range of possible parameter values where the consequences of a false negative decision error was not considered to be appropriate for this for this indoor air investigation.
	• Assign probability values to points above and below the action level that reflect the tolerable probability for the occurrence of decision errors.	Assigning probability values was not considered to be appropriate for this investigation of indoor air.
7.	**OPTIMIZE THE DESIGN FOR OBTAINING DATA** (To identify a resource-effective sampling and analysis design for generating data that are expected to satisfy the DQOs)	
	• Review the DQO outputs and existing environmental data.	See Steps above.

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

	• Develop general data collection design alternatives.	One design is modeling of indoor air concentrations based on collection of subsurface soil samples and no collection of direct indoor air samples. The other design is a direct collection of indoor air samples in the building at 115 River Road, given the distribution of dissolved-phase VOC plumes and NAPL within OU1. Indoor air samples are to be collected from within the building in areas that have the potential to have the most impact relative to the potential for VOCs to migrate into the building from subsurface dissolved-phase (VOC) plumes and NAPL. Ambient air samples are to be collected from upgradient areas relative to the building, but within a relative close proximity to the building to assess the quality of air near the building. The indoor and ambient air samples should be collected during different seasons, and at least one sampling event should be during the winter months. Samples will be collected in Summa canisters and analyzed for VOCs using EPA Method TO-15. Provisions for additional air samples should be iincluded in the investigation design.
	• Formulate the mathematical expressions necessary for each design alternative.	NA - the RI is a data gap filling investigation, VOC concentrations in indoor air will be determined at 115 River Road within OU1, and it is not impractical to develop mathematical expressions for the data gap filling design alternative.
	• Select the sample size that satisfies the DQOs for each design alternative.	NA - the RI is a data gap filling investigation, contamination in soil will be delineated at the site.

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

	• Select the most resource-effective design that satisfies all DQOs.	The most resource effective design is a direct collection of indoor air samples in the building at 115 River Road, given the distribution of dissolved-phase VOC plumes and NAPL within OU1. Indoor air samples are to be collected from within the building in areas that have the potential to have the most impact relative to the potential for VOCs to migrate into the building from subsurface dissolved-phase (VOC) plumes and NAPL. Ambient air samples are to be collected from upgradient areas relative to the building, but within a relative close proximity to the building to assess the quality of air near the building. The indoor and ambient air samples should be collected during different seasons, and at least one sampling event should be during the winter months. Samples will be collected in Summa canisters and analyzed for VOCs using EPA Method TO-15. Provisions for additional air samples should be included in the investigation design.

Table 1-4
Data Quality Objectives (DQO) for the Investigation of Indoor Air
Quanta Resources Site
Edgewater, New Jersey

	• Document the operational details and theoretical assumptions of the selected design in the Quality Assurance Project Plan (QAPP).	The operational requirements for implementing the indoor air data collection design are documented in the work plan titled, Vapor Intrusion Investigation Work Plan for 3Y LLC Development, April 13, 2005 that was developed by EWMA. The design elements in this document includes the following: • Sample size, • Sample type, • General collection techniques (Summa canister sampling), • Sample support, • Sample locations, • Timing issues for sample collection, • Analytical methods, and • QA / QC protocols.

Table 1-5
Analytical DQOs For Precision
Quanta Resources Site
Edgewater, New Jersey

Analytical Parameter [1] Matrix Spikes [2]	Compound	Precision as RPD (%) Water	Soil /Waste
1) TCL VOCs	1,1-Dichloroethene	14	22
	Trichloroethene	14	24
	Benzene	11	21
	Toluene	13	21
	Chlorobenzene	13	21
2) TCL SVOCs	Phenol	42	35
	2-Chlorophenol	40	50
	1,4-Dichlorobenzene	28	27
	N-Nitroso-di-n-propylamine	38	38
	1,2,4-Trichlorobenzene	28	23
	4-Chloro-3-methylplenol	42	33
	Acenaphthene	31	19
	4-Nitrophenol	50	50
	2,4-Dinitrotoluene	38	47
	Pentachloraphenol	50	47
	Pyrene	31	36
3) TCL PCBs	All PCBs	40	50
4) TCL Pesticides	Gamma-BHC (Lindane)	15	50
	Heptachlor	20	31
	Aldrin	22	43
	Dieldrin	18	38
	Endrin	21	45
	4,4'-DDT	27	50
5) TAL Metals	All metals	20	50
6) Hexavalent Chromium	Hexavalent Chromium	NA	35
5) TCLP VOCs	1,1-Dichloroethene	N/A	22
	Trichloroethene	N/A	24
	Benzene	N/A	21
	Toluene	N/A	21
	Chlorobenzene	N/A	21
6) TCLP SVOCs	Phenol	N/A	35
	2-Chlorophenol	N/A	50
	1,4-Dichlorobenzene	N/A	27
	N-Nitroso-di-n-propylamine	N/A	38
	1,2,4-Trichlorobenzene	N/A	23
	4-Chloro-3-methylplenol	N/A	33
	Acenaphthene	N/A	19
	4-Nitrophenol	N/A	50
	2,4-Dinitrotoluene	N/A	47
	Pentachloraphenol	N/A	47
	Pyrene	N/A	36
7) TCLP Metals	All TCLP Metals	N/A	35

Table 1-5
Analytical DQOs For Precision
Quanta Resources Site
Edgewater, New Jersey

Analytical Parameter [1] Matrix Spikes [2]	Compound	Precision as RPD (%) Water	Soil /Waste
Field Duplicates			
1) TCL VOCs	All VOCs	35	50
2) TCL SVOCs	All SVOCs	35	50
3) TCL PCBs	All PCBs	35	50
4) TCL Pesticides	All Pesticides	35	50
5) TAL Metals	All Metals	35	50
6) Hexavalent Chromium	Hexavalent Chromium	NA	35
7) TCLP VOCs	All VOCs	N/A	50
8) TCLP SVOCs	All TCLP SVOCs	N/A	50
9) TCLP Metals	All TCLP Metals	N/A	50

Notes: RPD - Relative percent difference.
TCL - Target compound list.
VOCs - Volatile organic compounds.
SVOCs - Semivolatile organic compounds.
PCBs - Polychlorinated biphenyls.
TCLP - Toxicity Characteristic Leaching Procedure.
TAL - Target analyte list.
N/A - Not applicable.

(1) Analytical parameter referenced from the USEPA Contract Laboratory Program (CLP).
(2) Includes matrix spike/matrix spike duplicate (MS/MSD) for organic analyses and matrix duplicate (MD) for inorganic analyses.

Table 1-6
Analytical DQOs For Accuracy
Quanta Resources Site
Edgewater, New Jersey

Analytical Parameter [1] Matrix Spikes [2]	Compound	Accuracy as % Recovery Water	Soil /Waste
1) TCL VOCs	1,1-Dichloroethene	61-145	59-172
	Trichloroethene	71-120	62-137
	Benzene	76-127	66-142
	Toluene	76-125	59-139
	Chlorobenzene	75-130	60-133
2) TCL SVOCs	Phenol	12-110	26-90
	2-Chlorophenol	27-123	25-102
	1,4-Dichlorobenzene	36-97	28-104
	N-Nitroso-di-n-propylamine	41-116	41-126
	1,2,4-Trichlorobenzene	39-98	38-107
	4-Choro-3-methylplenol	23-97	26-103
	Acenaphthene	46-118	31-137
	4-Nitrophenol	10-80	11-114
	2,4-Dinitrotoluene	24-96	28-89
	Pentachloraphenol	9-103	17-109
	Pyrene	26-127	35-142
3) TCL PCBs	All PCBs	30-150	30-150
4) TCL Pesticides	Gamma-BHC (Lindane)	56-123	46-127
	Heptachlor	40-131	35-130
	Aldrin	40-120	34-132
	Dieldrin	52-126	31-134
	Endrin	56-121	42-139
	4,4'-DDT	38-127	23-134
5) TAL Metals	All metals	75-125	N/A
6) Hexavalent Chromium	Hexavalent Chromium	N/A	75-125
7) TCLP VOCs	1,1-Dichloroethene	N/A	59-172
	Trichloroethene	N/A	62-137
	Benzene	N/A	66-142
	Toluene	N/A	59-139
	Chlorobenzene	N/A	60-133
8) TCLP SVOCs	Phenol	N/A	26-90
	2-Chlorophenol	N/A	25-102
	1,4-Dichlorobenzene	N/A	28-104
	N-Nitroso-di-n-propylamine	N/A	41-126
	1,2,4-Trichlorobenzene	N/A	38-107
	4-Choro-3-methylplenol	N/A	26-103
	Acenaphthene	N/A	31-137
	4-Nitrophenol	N/A	11-114
	2,4-Dinitrotoluene	N/A	28-89
	Pentachloraphenol	N/A	17-109
	Pyrene	N/A	35-142

Table 1-6
Analytical DQOs For Accuracy
Quanta Resources Site
Edgewater, New Jersey

Analytical Parameter [1] Matrix Spikes [2]	Compound	Accuracy as % Recovery Water	Soil /Waste
9) TCLP Metals	All TCLP metals	N/A	75-125
1) TCL VOCs	Toluene-d8	88-110	84-138
	Bromofluorobenzene	86-115	59-120
	1,2-Dichloroethane-d4	80-120	80-120
	Dibromofluoromethane	80-120	80-120
2) TCL SVOCs	Nitrobenzene-d5	35-114	23-120
	2-Fluorobiphenyl	43-116	30-115
	Terphenyl-d14	33-141	18-137
	Phenol-d5	10-110	24-113
	2-Fluorophenol	21-110	25-121
	2,4,6-Tribromophenol	10-123	19-122
	2-Chlorophenol-d4	33-110	20-130[3]
	1,2-Dichlorobenzene-d4	16-110	20-130[3]
3) TCL PCBs	Tetrachloro-m-xylene	20-141	30-150[3]
	Decachlorobiphenyl	63-130	30-150[3]
4) TCL Pesticides	Tetrachloro-m-xylene	20-141	30-150[3]
	Decachlorobiphenyl	63-130	30-150[3]
5) TCLP VOCs	Toluene-d8	N/A	84-138
	Bromofluorobenzene	N/A	59-113
	1,2-Dichloroethane-d4	N/A	70-121
	Dibromofluoromethane	N/A	56-137
6) TCLP SVOCs	Nitrobenzene-d5	N/A	23-120
	2-Fluorobiphenyl	N/A	30-115
	Terphenyl-d14	N/A	18-137
	Phenol-d5	N/A	24-113
	2-Fluorophenol	N/A	25-121
	2,4,6-Tribromophenol	N/A	19-122
	2-Chlorophenol-d4	N/A	20-130[3]
	1,2-Dichlorobenzene-d4	N/A	20-130[3]

Notes: TCL - Target compound list.
VOCs - Volatile organic compounds.
SVOCs - Semivolatile organic compounds.
PCBs - Polychlorinated biphenyls.
TCLP - Toxicity Characteristic Leaching Procedure.
TAL - Target analyte list.
N/A - Not applicable.

(1) Analytical parameter referenced from the USEPA Contract Laboratory Program (CLP).
(2) Includes matrix spike (MS) samples for organic and inorganic analyses; and matrix spike duplicate (MSD) and matrix spike blank (MSB) samples for organic analyses.
(3) Advisory limits only.

Table 1-7
Inorganic Target Analyte List and Contract Required Quantitation Limits (CRQLs)
Quanta Resources Site
Edgewater, New Jersey

Analyte	ICP-AES CRQL for Water (ug/L)	ICP-AES CRQL for Soil (mg/kg)	ICP-MS CRQL for Water (ug/L)
1. Aluminum	200	40	30
2. Antimony	60	12	2
3. Arsenic	15	3	1
4. Barium	200	40	10
5. Beryllium	5	1	1
6. Cadmium	5	1	1
7. Calcium	5000	1000	--
8. Chromium	10	2	2
9. Cobalt	50	10	0.5
10. Copper	25	5	2
11. Iron	100	20	--
12. Lead	10	2	1
13. Magnesium	5000	1000	--
14. Manganese	15	3	0.5
15. Mercury	0.2	0.1	--
16. Nickel	40	8	1
17. Potassium	5000	1000	--
18. Selenium	35	7	5
19. Silver	10	2	1
20. Sodium	5000	1000	--
21. Thallium	25	5	1
22. Vanadium	50	10	1
23. Zinc	60	12	1
24. Cyanide	10	1	--

Source: EPA Publication 540-F-02-008, October 2002.

Table 1-7
Target Compound List and Contract Required Quantitation Limits (CRQLs) For OLM04.3*
Quanta Resources Site
Edgewater, New Jersey

Quantitation Limits			
	Water (µg/L)	Low Soil (µg/Kg)	Modified Cal. [1] Levels (µg/L)
VOLATILES			
1. Dichlorodifluoromethane	10	10	0.5
2. Chloromethane	10	10	0.5
3. Vinyl Chloride	10	10	0.5
4. Bromomethane	10	10	0.5
5. Chloroethane	10	10	0.5
6. Trichlorofluoromethane	10	10	0.5
7. 1,1-Dichloroethene	10	10	0.5
8. 1,1,2-Trichloro-1,2,2-trifluoroethane	10	10	0.5
9. Acetone	10	10	10
10. Carbon Disulfide	10	10	0.5
11. Methyl Acetate	10	10	0.5
12. Methylene Chloride	10	10	0.5
13. trans-1,2-Dichloroethene	10	10	0.5
14. Methyl tert-Butyl Ether	10	10	0.5
15. 1,1-Dichloroethane	10	10	0.5
16. cis-1,2-Dichloroethene	10	10	0.5
17. 2-Butanone	10	10	10
18. Chloroform	10	10	0.5
19. 1,1,1-Trichloroethane	10	10	0.5
20. Cyclohexane	10	10	0.5
21. Carbon Tetrachloride	10	10	0.5
22. Benzene	10	10	0.5
23. 1,2-Dichloroethane	10	10	0.5
24. Trichloroethene	10	10	0.5
25. Methylcyclohexane	10	10	0.5
26. 1,2-Dichloropropane	10	10	0.5
27. Bromodichloromethane	10	10	0.5
28. cis-1,3-Dichloropropene	10	10	0.5
29. 4-Methyl-2-pentanone	10	10	10
30. Toluene	10	10	0.5
31. trans-1,3-Dichloropropene	10	10	0.5
32. 1,1,2-Trichloroethane	10	10	0.5

Quantitation Limits		
	Water (µg/L)	Low Soil (µg/Kg)
SEMIVOLATILES		
49. Benzaldehyde	10	330
50. Phenol	10	330
51. bis-(2-Chloroethyl)ether	10	330
52. 2-Chlorophenol	10	330
53. 2-Methylphenol	10	330
54. 2,2'-oxybis(1-Chloropropane)	10	330
55. Acetophenone	10	330
56. 4-Methylphenol	10	330
57. N-Nitroso-di-npropylamine	10	330
58. Hexachloroethane	10	330
59. Nitrobenzene	10	330
60. Isophorone	10	330
61. 2-Nitrophenol	10	330
62. 2,4-Dimethylphenol	10	330
63. bis-(2-Chloroethoxy) methane	10	330
64. 2,4-Dichlorophenol	10	330
65. Naphthalene	10	330
66. 4-Chloroaniline	10	330
67. Hexachlorobutadiene	10	330
68. Caprolactam	10	330
69. 4-Chloro-3-methylphenol	10	330
70. 2-Methylnaphthalene	10	330
71. Hexachlorocyclo-pentadiene	10	330
72. 2,4,6-Trichlorophenol	10	330
73. 2,4,5-Trichlorophenol	25	830
74. 1,1'-Biphenyl	10	330
75. 2-Chloronaphthalene	10	330
76. 2-Nitroaniline	25	830
77. Dimethylphthalate	10	330
78. 2,6-Dinitrotoluene	10	330
79. Acenaphthylene	10	330
80. 3-Nitroaniline	25	830
81. Acenaphthene	10	330

Quantitation Limits		
	Water (µg/L)	Low Soil (µg/Kg)
98. Carbazole	10	330
99. Di-n-butylphthalate	10	330
100. Fluoranthene	10	330
101. Pyrene	10	330
102. Butylbenzylphthalate	10	330
103. 3,3'-Dichlorobenzidine	10	330
104. Benzo(a)anthracene	10	330
105. Chrysene	10	330
106. bis-(2-Ethylhexyl)phthalate	10	330
107. Di-n-octylphthalate	10	330
108. Benzo(b)fluoranthene	10	330
109. Benzo(k)fluoranthene	10	330
110. Benzo(a)pyrene	10	330
111. Indeno(1,2,3-cd)pyrene	10	330
112. Dibenz(a,h)anthracene	10	330
113. Benzo(g,h,i)perylene	10	330
PESTICIDES/AROCLORS (PESTICIDES/PCBs)	**Water (µg/L)**	**Soil (µg/Kg)**
114. alpha-BHC	0.05	1.7
115. beta-BHC	0.05	1.7
116. delta-BHC	0.05	1.7
117. gamma-BHC (Lindane)	0.05	1.7
118. Heptachlor	0.05	1.7
119. Aldrin	0.05	1.7
120. Heptachlor epoxide	0.05	1.7
121. Endosulfan I	0.05	1.7
122. Dieldrin	0.1	3.3
123. 4,4'-DDE	0.1	3.3
124. Endrin	0.1	3.3
125. Endosulfan II	0.1	3.3
126. 4,4'-DDD	0.1	3.3
127. Endosulfan sulfate	0.1	3.3
128. 4,4'-DDT	0.1	3.3

Table 1-7
Target Compound List and Contract Required Quantitation Limits (CRQLs) For OLM04.3*
Quanta Resources Site
Edgewater, New Jersey

Quantitation Limits			
	Water (µg/L)	Low Soil (µg/Kg)	Modified Cal.[1] Levels (µg/L)
VOLATILES (cont.)			
33. Tetrachloroethene	10	10	0.5
34. 2-Hexanone	10	10	0.5
35. Dibromochloromethane	10	10	10
36. 1,2-Dibromoethane	10	10	0.5
37. Chlorobenzene	10	10	0.5
38. Ethylbenzene	10	10	0.5
39. Xylenes (Total)	10	10	0.5
40. Styrene	10	10	0.5
41. Bromoform	10	10	0.5
42. Isopropylbenzene	10	10	0.5
43. 1,1,2,2-Tetrachloroethane	10	10	0.5
44. 1,3-Dichlorobenzene	10	10	0.5
45. 1,4-Dichlorobenzene	10	10	0.5
46. 1,2-Dichlorobenzene	10	10	0.5
47. 1,2-Dibromo-3-chloropropane	10	10	0.5
48. 1,2,4-Triclorobenzene	10	10	0.5

Quantitation Limits		
	Water (µg/L)	Low Soil (µg/Kg)
SEMIVOLATILES (cont.)		
82. 2,4-Dinitrophenol	25	830
83. 4-Nitrophenol	25	830
84. Dibenzofuran	10	330
85. 2,4-Dinitrotoluene	10	330
86. Diethylphthalate	10	330
87. Fluorene	10	330
88. 4-Chlorophenyl-phenyl ether	10	830
89. 4-Nitroaniline	25	830
90. 4,6-Dinitro-2-methylphenol	25	830
91. N-Nitrosodiphenylamine	10	330
92. 4-Bromophenyl-phenylether	10	330
93. Hexachlorobenzene	10	330
94. Atrazine	10	330
95. Pentachlorophenol	25	830
96. Phenanthrene	10	330
97. Anthracene	10	330

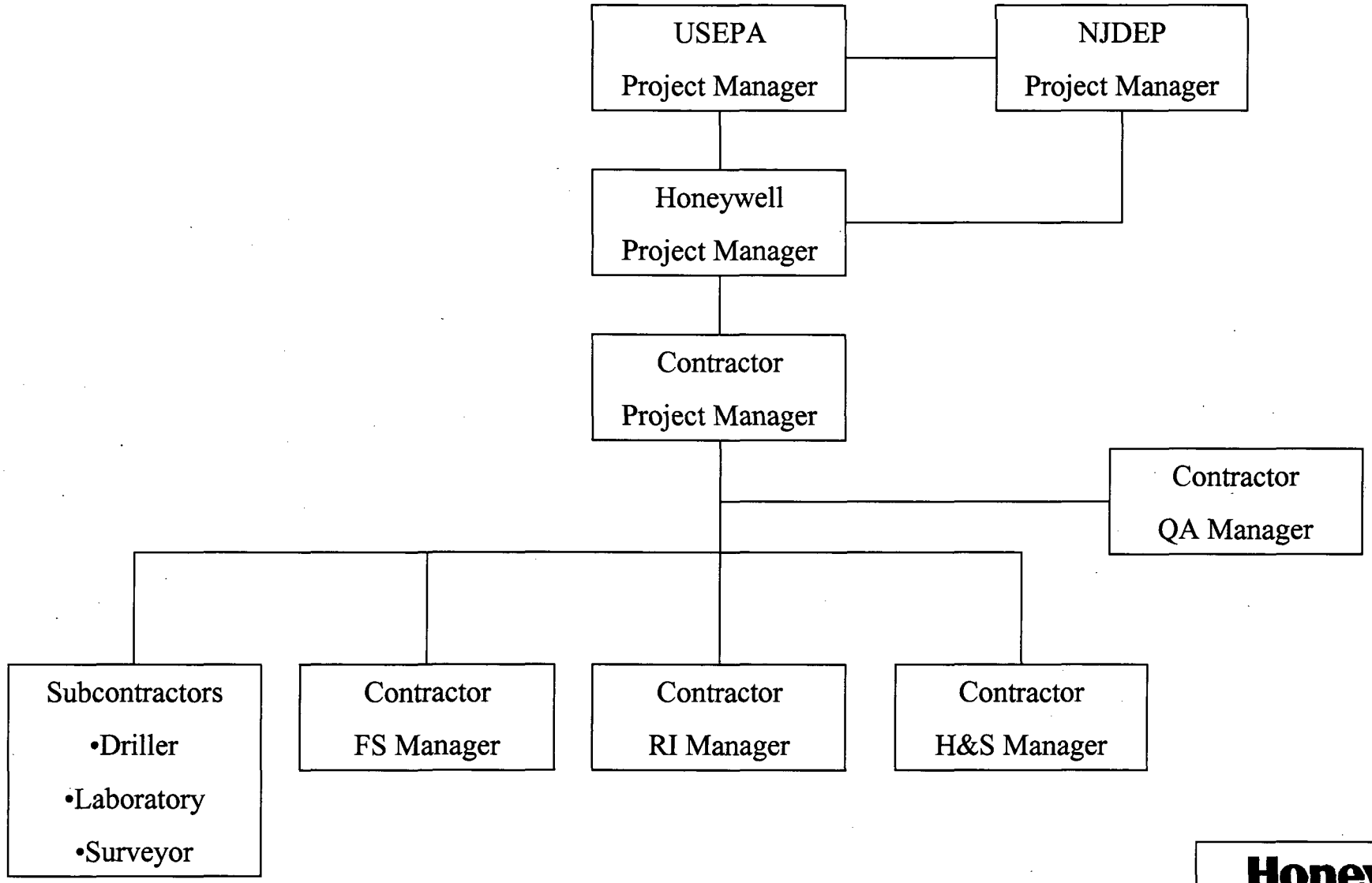
Quantitation Limits		
PESTICIDES/AROCLORS (PESTICIDES/PCBs)	**Water (µg/L)**	**Low Soil (µg/Kg)**
129. Methoxychlor	0.5	17
130. Endrin ketone	0.1	3.3
131. Endrin aldehyde	0.1	3.3
132. alpha-Chlordane	0.05	1.7
133. gamma-Chlordane	0.05	1.7
134. Toxaphene	5	170
135. Aroclor-1016	1	33
136. Aroclor-1221	2	67
137. Aroclor-1232	1	33
138. Aroclor-1242	1	33
139. Aroclor-1248	1	33
140. Aroclor-1254	1	33
141. Aroclor-1260	1	33

Notes:
*For volatiles, quantitation limits for medium soils are approximately 130 times the quantitation limits for low soils. For semivolatile medium soils, quantitation limits are approximately 30 times the quantitation limits for low soils.

[1]Modified quantitation limits are available under the Flexibility Clause.

Source: EPA Publication 540-F-03-005, August 2003.

FIGURES

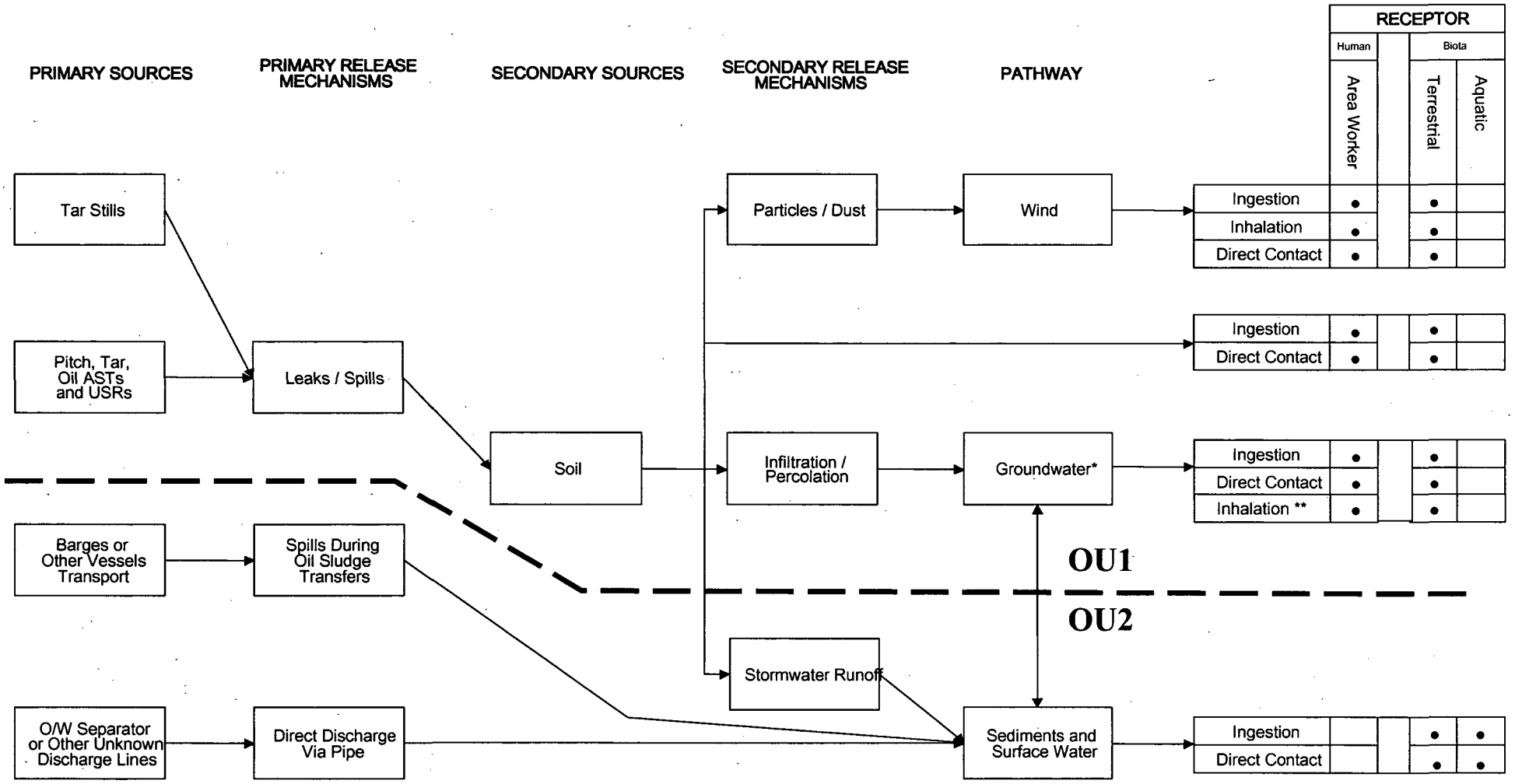


Honeywell

PARSONS

Quanta Resources RI/FS
Edgewater, NJ

Figure 1-1
Organizational Chart
For Communication



Notes:
* Includes movement of ground through underground utilities.
** The inhalation receptor category for ground water is from volatilization of contaminants from ground water Into soil vapor and eventually into indoor air.

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Edgewater, NJ

Figure 1-2
Conceptual Site Model

SECTION 2
DATA GENERATION AND AQUSITION ELEMENTS

2.1 SAMPLING PROCESS DESIGN (EXPERIMENTAL DESIGN)

Sampling program will provide data concerning the presence and the nature and extent of contamination of ground water and soil, if any. This section presents sample container preparation procedures, sample preservation procedures, sample holding times, and field QC sample requirements. Sample locations and the number of environmental and QC samples to be collected are specified in the Work Plan and FSP. All sampling procedures are presented in the FSP.

2.2 SAMPLING METHODS

Surface soils, subsurface soils, and ground water will be sampled and analyzed for selected CLP Organics and Inorganics by OLM04.3 and ILMO5.2 (TCL Organics and certain TAL Metals) VOC, SVOC, PCB, pesticides, and metals. Other data to be collected at the site include hexavalent chromium, ammonia, geotechnical data, in-situ permeability tests, a tidal study, and an indoor air survey (see Table 1-1 and 1-2 of the FSP). Detailed sampling procedures (i.e., deploying instruments, splitting, homogenization, compositing, or filtering samples) are presented in the FSP and the Work Plan for the Site. Performance requirements are presented in Section 1.4 of this document.

Prior to collecting samples, all sample containers will be properly washed and decontaminated prior to their use by either the analytical laboratory or the container vendor to the specifications required by the CLP OLM04.3 and ILMO5.2. Copies of the sample container QC analyses will be provided by the laboratory for each container lot used to obtain samples. Samples shall be preserved according to the preservation techniques given in Tables 2-1 and 2-2. Preservatives will be added to the sample bottles by the laboratory prior to their shipment in sufficient quantities to ensure that proper sample pH is met. Preservation will be checked in the field to verify that the appropriate pH has been achieved (e.g., ≤ 2 for aqueous metals samples). Following sample collection, the sample bottles should be placed in the shipping cooler, cooled to 4°C with ice.

If a problem occurs with the sampling methods, the project manager shall be notified immediately and a copy of the correspondence shall be placed into the files.

2.3 SAMPLE HANDLING AND CUSTODY

This section presents sample custody procedures for both the field and laboratory. Implementation of proper custody procedures for samples generated in the field is the responsibility of field personnel. Both laboratory and field personnel involved in the COC and transfer of samples will be trained as to the purpose and procedures prior to implementation. The applicable holding times for each matrix and analyses is stated in Section 2.2. Sample identification and designation is indicated in the FSP.

Evidence of sample traceability and integrity is provided by COC procedures. These procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. A sample is considered to be in a person's custody if the sample is:

- In a person's possession;
- Maintained in view after possession is accepted and documented;
- Locked and tagged with custody seals so that no one can tamper with it after having been in physical custody; or
- In a secured area that is restricted to authorized personnel.

An example COC form and custody seal is included in the FSP.

2.3.1 Field Sample Custody

A COC record accompanies the sample containers from selection and preparation at the laboratory, during shipment to the field for sample containment and preservation, and during return to the laboratory. Triplicate copies of the COC must be completed for each sample set collected.

The COC lists the field personnel responsible for taking samples, the project name and number, the name of the analytical laboratory to which the samples are sent, and the method of sample shipment. The COC also lists a unique description of every sample bottle in the set. If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample.

The Special Instructions space on the COC is used to indicate if the sample is a matrix spike, matrix spike duplicate, or any other sample information for the laboratory. Since they are not specific to any one-sample point, trip and field blanks are indicated on separate rows. Once all bottles are properly accounted for on the form, a sampler will write his or her signature and the date and time on the first RELINQUISHED BY space. The sampler will also write the method of shipment, the shipping cooler identification number, and the shipper air bill number on the top of the COC. Mistakes will be crossed out with a single line in ink and initialed by the author.

Sampling personnel retain one copy of the COC and the other two copies are put into a sealable plastic bag and taped inside the lid of the shipping cooler. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, and the person relinquishing the samples signs their name across the seal. The seal is taped, and the cooler is wrapped tightly with clear packing tape. It is then relinquished by field personnel to personnel responsible for shipment, typically an overnight carrier. The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the sample will not be analyzed.

All data collected on site will be copied and sent to the Parsons Boston Office, and the originals will be stored on-site or at the local field office. All original data will be forwarded to the Parsons Boston Office.

2.3.2 Laboratory Sample Custody

The Project Manager or Field Team Leader will notify the laboratory of upcoming field sampling activities, and the subsequent shipment of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The following laboratory sample custody procedures will be used:

- The laboratory will designate a sample custodian who will be responsible for maintaining custody of the samples, and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check cooler temperature, and check the original COC documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian will sign the COC record and record the date and time received.
- Care will be exercised to annotate any labeling or descriptive errors. In the event of discrepant documentation, the laboratory will immediately contact the Project Manager or Field Team Leader as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken or leaking bottles. This assessment will be recorded as part of the incoming chain-of-custody procedure.
- The samples will be stored in a secured area at a temperature of approximately 4 degrees Celsius until analyses commence.
- A laboratory tracking record will accompany the sample or sample fraction through final analysis for control.
- A copy of the tracking record will accompany the laboratory report and will become a permanent part of the project records.

2.4 ANALYTICAL METHODS

Samples will be analyzed according to the procedures specified by the current USEPA SW-846 and USEPA CLP Method OLM04.3 and Method ILM05.2. The methods to be used for the laboratory analysis of water and soil samples are presented in Tables 2-4 and 2-5. These methods were selected because they best meet the requirements of the RI. Specific performance criteria are discussed in other Section 1.4 of this document.

2.4.1 Metals Analyses

CLP inorganic analyses for ground water and soil samples will be performed by Multimedia, Multiconcentration, Inorganic Analytical Services for Superfund (ILM05.2). This analyses will be either Inductively Coupled Plasma – Atomic Emission Spectroscopy (ICP-AES) or by Inductively Coupled Plasma – Mass Spectrometry (ICP-MS). Prior to analyzing any samples, the instrument(s) must be properly calibrated in accordance with the method and all QA/QC procedure.

Hexavalent chromium analysis for soil samples will be performed by UV Visible Spectrophotometry (SW-846 Method 7196A). Prior to analyzing any samples, the instrument(s) must be properly calibrated in accordance with the method and all QA/QC procedure.

2.4.2 Volatile Organic Analysis

CLP organic analyses (TCL VOC) for ground water and soil samples will be performed for volatile organics by Multimedia, Multiconcentration, Organic Analytical Service for Superfund (OLM04.3). The ground water analysis will use purge-and-trap followed by GC/MS, and soil will be analyzed by purge-and-trap or closed system purge-and-trap followed by GC/MS. Prior to analyzing any samples, the instrument(s) must be properly calibrated in accordance with the method and all QA/QC procedure.

2.4.3 Semivolatile Organic Analysis

CLP organic analyses (TCL SVOC) for ground water and soil samples will be performed for volatile organics by Multimedia, Multiconcentration, Organic Analytical Service for Superfund (OLM04.3). Ground water analysis will be continuous liquid-liquid extraction and GC/MS. Soil samples will be analyzed by sonication, automated soxhlet, or pressurized fluid extraction followed by GC/MS. Prior to analyzing any samples the instrument(s) must be properly calibrated in accordance with the method and all QA/QC procedure.

2.4.4 PCB Analysis

CLP organic analyses (TCL PCB) for ground water and soil samples will be performed for volatile organics by Multimedia, Multiconcentration, Organic Analytical Service for Superfund (OLM04.3). Ground water samples will be analyzed by continuous liquid-liquid or separatory funnel extraction followed by dual column GC/EC analysis. Soil samples will be analyzed by Sonication, automated soxhlet, or pressurized fluid extraction followed by GC/EC analysis. Prior to analyzing any samples, the instrument(s) must be properly calibrated in accordance with the method and all QA/QC procedure.

2.4.5 Pesticide Analysis

CLP organic analyses (TCL Pesticides) for ground water and soil samples will be performed for volatile organics by Multimedia, Multiconcentration, Organic Analytical Service for Superfund (OLM04.3). Ground water samples will be analyzed by continuous liquid-liquid or separatory funnel extraction followed by dual column GC/EC analysis. Soil samples will be analyzed by Sonication, automated soxhlet, or pressurized fluid extraction followed by GC/EC analysis. Prior to analyzing any samples, the instrument(s) must be properly calibrated in accordance with the method and all QA/QC procedure.

2.4.6 Other Analysis

Soil and ground water samples will be analyzed for Ammonia by EPA Method 350.1. Prior to analyzing any samples, the instruments must be properly calibrated in accordance with the method and all QA/QC procedure.

2.4.7 Field Measurement Procedures

Field measurements of temperature, turbidity, dissolve oxygen, pH, specific conductance, ORP, and water levels will be performed at the time of sample collection. All parameters will be collected using a Horiba U-22 Water Quality Monitoring System (with flow through cell) (or equivalent), except for water level measurements. The U-22 will be calibrated according to the manufactures specifications.

Water levels will be taken in rounds and prior to and after purging the monitoring wells as discussed in the FSP. Water level measurements will be made using a Solinist electric water level indicator or equivalent. Water levels will be measured from a notch on the inner casing of a well and recorded (to the nearest 0.01 foot) for monitoring wells. The presence of NAPL will be determined using an oil / water interface probe.

Headspace screening measurements of organic vapor in wells and soil samples will be collected using a PID. The detector will be operationally checked every day against the source gas. The units will also be periodically checked during periods of continued use.

NAPL will be detected using the procedures outlined in Figure 5-2 in the Work Plan and the Field Sampling Plan. The process includes visual observations, jar-head space tests, Sudan IV or UV Fluorescence Kit (e.g., a UVF-3100), and analytical testing if necessary.

2.5 QUALITY CONTROL

Each set of samples will be analyzed concurrently with calibration standards, method blanks, instrument blanks, storage blanks, internal standards, matrix spikes (MS), matrix spike duplicates (MSD) or laboratory duplicates, and QC check samples (if required by the protocol). The frequency of the QC checks will be in accordance with the CLP methods for organic (OLM04.3) and inorganic (ILM05.2) analysis and the FSP. In addition, the required calibration procedures will be discussed in Section 2.7. The field personnel will designate the MS/MSD samples, if no MS/MSD samples have been designated, the laboratory will contact the project QAO for corrective action. A copy of the laboratory's quality assurance plan (LQAP), laboratory certification, and the results of PE samples from the past six months will be submitted to the USEPA prior to the start of field work.

2.5.1 Calibration Standards and Surrogates

All organic standard and surrogate compounds are checked by the method of mass spectrometry for correct identification and gas chromatography for degree of purity and concentration. All standards are traceable to a source of known quality certified by the USEPA or NIST, or other similar program. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions. Concentrations of the solutions are checked for accuracy before release for laboratory use. Standard solutions are replaced monthly or more frequently, based upon data indicating deterioration.

2.5.2 Organic Blanks

Analysis of blank samples verifies that the analytical method does not introduce contaminants or detect "false positives". The blank water can be generated by reverse osmosis

and Super-Q filtration systems, or distillation of water containing $KMnO_4$. The matrix spike is generated by addition of surrogate standard to each sample.

All blank water (trip blanks and lab-provided water for field rinsate blanks) will be prepared for the laboratory in the same manner as water used by the laboratory for analysis, and will be traceable to a specific laboratory method or instrument blank analysis.

2.5.3 Field QC Samples

To assess field sampling and decontamination performance, two types of "blanks" will be collected and submitted to the laboratory for analyses. In addition, the precision of field sampling procedures will be assessed by collecting coded field duplicates and matrix spike/matrix spike duplicates (MS/MSDs). The blanks will include:

- Trip Blanks - A Trip Blank will be prepared before the laboratory sends the sample containers. The trip blank will consist of a 40-ml VOA vial containing distilled, deionized water, which accompanies the other aqueous and methanol-preserved soil sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of water samples for target compound list (TCL) volatiles analysis. The trip blank will be analyzed for TCL volatile organic compounds to access any contamination from sampling and transport, and internal laboratory procedures.

- Field Blanks - Field Blanks will be taken at a frequency of one per decontamination event, maximum of one day per sampling equipment type, minimum of one per week. Field blanks are used to determine the effectiveness of the decontamination procedures for sampling equipment. It is a sample of deionized, distilled water provided by the laboratory, which has passed through a decontaminated bailer or other sampling apparatus. It is usually collected as a last step in the decontamination procedure, prior to taking an aqueous sample. The field blank may be analyzed for all of the parameters of interest.

- Duplicates will consist of:

  - Field Duplicate - To determine the representativeness of the sampling methods, field duplicates will be collected at a frequency of one per 20 environmental samples per matrix.

  - Matrix Spike/Matrix Spike Duplicate (MS/MSD) - MS/MSD samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be taken at a frequency of one pair per 20 field samples. These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes. The percent recoveries and RPDs are given in Tables 1-1 and 1-2.

2.6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

2.6.1 Preventive Maintenance Procedures

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators.

The manufacturer established a list of critical spare parts, so that commonly needed parts can be inventoried and stored at the laboratory. These spare parts will be available for use in order to reduce the downtime. A service contract for rapid instrument repair or backup instruments may be substituted for the spare part inventory. A maintenance log is kept with each instrument to record all maintenance.

2.6.2 Schedules

Written procedures (i.e., SOPs, analytical methods, and operating manuals) will establish the schedule for servicing critical items in order to minimize the downtime of the measurement system. The laboratory will adhere to the maintenance schedule, and arrange any necessary and prompt service. Qualified personnel will perform required service.

2.6.3 Records

Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories. The QAO may audit these records to verify complete adherence to these procedures.

2.7 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

2.7.1 Field Instruments

All field analytical equipment will be calibrated immediately prior to each day's use. The calibration procedures will conform to manufacturer's standard instructions. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. Records of all instrument calibration will be maintained by the Field Team Leader and will be subjected to audit by the project QAO. The Field Team Leader will maintain copies of all the instrument manuals on-site.

Calibration procedures for instruments used for monitoring health and safety hazards (e.g., PID/FID and combustible gas meter) are provided in the Health and Safety Plan (HSP).

2.7.2 Laboratory Instruments

The laboratory will follow all calibration procedures and schedules as specified by the current CLP Methods for organic (OLM04.3) and inorganic (ILM05.2) analyses and the Laboratory SOP that apply to the instruments necessary for the analytical methods given in Tables 2-4 and 2-5.

Gas Chromatography/Mass Spectrometry (GC/MS)

Prior to analysis of samples, the instrument is tuned with bromoflurobenzene (BFB) for volatile compounds and decafluorotriphenylphosphine (DFTPP) for semivolatile compounds or other tune criteria as specified by the method used. No samples are analyzed until the instrument has met the tuning criteria of the method.

In general, the instrument is then calibrated for all target compounds. An initial calibration curve is produced to define the working range to establish criteria for identification. This initial calibration is evaluated on a daily basis to ensure that the system is within calibration. If the daily standard does not meet the established criteria, the system is recalibrated (STL 2003).

Metals – ICP and AA

Each ICP is calibrated prior to use by analyzing a multi-element calibration standard. The calibration is then verified using standards from an independent source. For CLP linear range verification check standard is analyzed and reported quarterly for each element analyzed by ICP. This concentration is the upper limit of the ICP linear range and any result found above this limit must be diluted and reanalyzed. The calibration is monitored throughout the day by analyzing a Continuing Calibration Blank (CCB) and a Continuing Calibration Verification (CCV) standard. If the verification standard does not meet established criteria, corrective action is performed.

Each AA unit is calibrated prior to any analyses being conducted. A calibration curve is prepared with a minimum of a calibration blank and three standards and then verified with a standard that has been prepared from an independent source at a concentration near the middle of the calibration range. The calibration is then verified on an ongoing basis with a calibration blank and CCV. If the ongoing calibration standard does not meet established acceptance criteria, corrective action is performed.

All samples for furnace analyses are single-spiked. The method of standard additions or sample dilution is used when the single spike analysis indicated matrix interferences are present. (STL, 2003).

Wet Chemistry

The field of classical (wet) chemistry involves a variety of instrumental and wet chemical techniques. Calibration and standardization procedures vary depending on the system and analytical methodology required for a specific analysis. The calibration is checked on an ongoing basis to ensure that the system remains within specifications. If the ongoing calibration check does not meet established criteria, analysis is halted and corrective action is taken. The procedures include examination of instrument performance and recalibration and reanalysis of samples back to the previous acceptable calibration check. (STL, 2003).

2.8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

List of supplies critical to the project are presented in the FSP. The Field Team Manager will be responsible to ensure that the proper equipment is present and available. For all field sampling supplies the primary source shall be Pine Environmental of New Jersey. The Field Team Leader shall establish a secure storage area for all equipment. All equipment shall be certified clean by the supplier.

2.9 NON-DIRECT MEASUREMENTS

Data from previous sampling events exist for the Quanta Site and are presented in the Removal Site Investigation (RSI) (GeoSyntec 2000) and Engineering Evaluation / Cost Analysis (EE/CA) Reports (GeoSyntec 2001). The data includes analytical results for soil and ground water, along with geological cross sections, figures, and other field investigation results. Other data that may be used include, chemical background, tide data and stream flow data from the Hudson River from a variety of sources.

The data from the RSI and EE/CA were used to locate areas that needed further investigation and to design the RI/FS Work Plan and FSP. The data will also be incorporated into updated GIS database and analytical database. It should be noted that previously collected analytical results will be validated, if possible.

2.10 DATA MANAGEMENT

2.10.1 Introduction

Data collected during the field investigation will be reduced, reviewed, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified in the CLP Method for organic (OLM04.3) and inorganic analyses (ILM05.2). Data deliverables will be reported as CLP Method Complete Sample Delivery Group Files (CSF). In addition, the USEPA shall have access to the lab and site data upon request.

The completed copies of the COC records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

2.10.2 Analytical Data Reduction

The laboratory will provide two copies of the analytical data packages and an electronic disk deliverable approximately 20 business days after receipt of a complete sample delivery group. The Project Manager will immediately arrange for filing one package; a second copy, and the disk deliverable, will be used to generate summary tables. These tables will form the database for assessment of the site contamination condition. The Parsons QA reviewer will check the package to ensure all deliverables have been provided by performing validation. If problems are identified, the laboratory will be alerted, and corrective actions will be requested.

The electronic deliverable formats will be submitted according to the CLP Methods (OLM04.3 and ILM05.2) and the Honeywell EDD requirements. All compact disk/diskette deliverables must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager or Task Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

TABLES

Table 2-1
Water Sample Containerization, Preservation, and Holding Times
Quanta Resources Site
Edgewater, New Jersey

Analysis	Bottle Type	Preservation [a]	Holding Time [b]
Volatile Organic Compounds (VOCs)	3-40 mL glass vial w/ Teflon septum	HCl to pH<2 Cool to 4°C	10 days
Semivolatile Organic Compounds (SVOCs)	2-L Amber Glass w/teflon cap	Cool to 4°C	5 days*
PCBs	2-L Amber Glass w/teflon cap	Cool to 4°C	5 days*
Pesticides	2-L Amber Glass w/Teflon cap	Cool to 4^0C	5 days*
Metals	1000 mL plastic bottle	Nitric Acid to pH < 2 Cool to 4°C	6 months, except mercury (26 days)
Hexavalent Chromium	500 mL plastic bottle	Cool to 4^0C	24 hours
Ammonia	500 mL plastic or glass	H_2SO_4 to pH < 2 Cool to 4^0C	28 days

(a) All samples to be preserved on ice during collection and transport.
(b) Days from verified time of sample receipt (VTSR).
* Extraction of water samples for SVOC, PCB, and Pesticide analysis must be completed within five (5) days. Extracts of water samples must be analyzed within 40 days.
PCBs = Polychlorinated Biphenyls.

Table 2-2
Soil and Waste Sample Containerization and Holding Times
Quanta Resources Site
Edgewater, New Jersey

Analysis	Bottle Type	Preservation [a]	Holding Time [b]
Volatile Organic Compounds (VOCs)	15g Encore[tm] vials	Cool to 4°C[1]	10 days
Semivolatile Organic Compounds (SVOCs)	(100g) 8 oz Wide-mouth glass w/teflon lined cap	Cool to 4°C	10 days*
PCBs	(100g) 8 oz Wide-mouth glass w/Teflon lined cap	Cool to 4°C	10 days*
Pesticides	(100g) 8 oz Wide-mouth glass w/Teflon lined cap	Cool to 4°C	10 days*
Metals	(100g) 8 oz Wide-mouth glass w/teflon lined cap	Cool to 4°C	6 months
Ammonia	(100g) 8 oz Wide-mouth Glass w/Teflon lined cap	Cool to 4°C	10 days*
Hazardous Materials			
TCLP VOCs	8 oz.Wide-mouth glass w/Teflon® lined cap	Cool to 4°C	See Table 4.3
TCLP SVOCs	8 oz Wide-mouth glass w/Teflon® lined cap	Cool to 4°C	See Table 4.3
Corrosivity, Ignitability, Reactivity	Wide-mouth glass	Cool to 4°C	7 days
TCLP Metals	8 oz Wide-mouth plastic or glass	Cool to 4°C	See Table 4.3

[a]All samples to be preserved on ice during collection and transport.

[b]Days from verified time of sample receipt (VTSR).

*Extraction and concentration of soil samples for SVOCs, PCBs, and Pesticides must be completed within ten (10) days. Extracts of soil samples must be analyzed within 40 days.

PCBs - Polychlorinated Biphenyls

TCLP - Toxicity Characteristic Leaching Procedure

VOCs - Volatile Organic Compounds

SVOCs - Semivolatile Organic Compounds

1 - Presentation at the laboratory required within 48 hours of sample collection.

Table 2-3
TCLP Sample Holding Time Requirements
Quanta Resources Site
Edgewater, New Jersey

Analysis	From Field Collection to TCLP Extraction	From TCLP Extraction to Preparative Extraction	From Preparative Extraction to Analysis
Volatiles	7 days	N/A	7 days
Semivolatiles	5 days	7 days	40 days
Metals	6 months	N/A	6 months

Notes: TCLP - Toxicity Characteristic Leaching Procedure
N/A - Not applicable Sampling methods

Table 2-4
Analytical Methods for Water Samples
Quanta Resources Site
Edgewater, New Jersey

Parameter [a]	Analytical Method [b]	Analytical Instrument
Organic Compounds		
TCL VOCs	OLM04.3	GC/MS
TCL SVOCs	OLM04.3	GC/MS
TCL PCBs	OLM04.3	GC/ECD
TCL Pesticides	OLM04.3	GC/ECD
Metals		
Aluminum	ILM05.2	ICP
Antimony	ILM05.2	ICP
Arsenic	ILM05.2	ICP
Barium	ILM05.2	ICP
Beryllium	ILM05.2	ICP
Cadmium	ILM05.2	ICP
Calcium	ILM05.2	ICP
Chromium	ILM05.2	ICP
Cobalt	ILM05.2	ICP
Copper	ILM05.2	ICP
Iron	ILM05.2	ICP
Lead	ILM05.2	ICP
Magnesium	ILM05.2	ICP
Manganese	ILM05.2	ICP
Mercury	ILM05.2	Cold Vapor AA
Nickel	ILM05.2	ICP
Potassium	ILM05.2	ICP
Selenium	ILM05.2	ICP
Silver	ILM05.2	ICP
Sodium	ILM05.2	ICP
Thallium	ILM05.2	ICP
Vanadium	ILM05.2	ICP
Zinc	ILM05.2	ICP
Cyanide	ILM05.2	Colorimetric
Other		
Ammonia	EPA Method 350.1	Colorimetry

[a]Abbreviations: VOCs = volatile organic compounds;
SVOCs = semivolatile organic compounds;
PCBs = polychlorinated biphenyls.

[b]USEPA CLP, dated October 1995 and USEPA SW-846 Test Methods for Evaluating Solid Waste, Physical and Chemical, dated December 1996.

Table 2-5
Analytical Methods for Soil and Waste Samples
Quanta Resources Site
Edgewater, New Jersey

Analytical Parameter (a)	Analytical Method (b)	Instrument
Organic Compounds		
TCL VOCs	OLM04.3	GC/MS
TCL SVOCs	OLM04.3	GC/MS
TCL PCBs	OLM04.3	GC/ECD
TCL Pesticides	OLM04.3	GC/ECD
Metals		
Aluminum	ILM05.2	ICP
Antimony	ILM05.2	ICP
Arsenic	ILM05.2	ICP
Barium	ILM05.2	ICP
Beryllium	ILM05.2	ICP
Cadmium	ILM05.2	ICP
Calcium	ILM05.2	ICP
Chromium	ILM05.2	ICP
Cobalt	ILM05.2	ICP
Copper	ILM05.2	ICP
Iron	ILM05.2	ICP
Lead	ILM05.2	ICP
Magnesium	ILM05.2	ICP
Manganese	ILM05.2	ICP
Mercury	ILM05.2	Cold Vapor AA
Nickel	ILM05.2	ICP
Potassium	ILM05.2	ICP
Selenium	ILM05.2	ICP
Silver	ILM05.2	ICP
Sodium	ILM05.2	ICP
Thallium	ILM05.2	ICP
Vanadium	ILM05.2	ICP
Zinc	ILM05.2	ICP
Cyanide	ILM05.2	Colorimetric
Hexavalent Chromium	SW-846 Method 7196A	UV-Visible Spectrophotometry
Other		
Ammonia	EPA Method 350.1	Colorimetry
TCLP Volatiles		
Benzene	1311/8260B	GC/MS
Carbon Tetrachloride	1311/8260B	GC/MS
Chloroform	1311/8260B	GC/MS
Chlorobenzene	1311/8260B	GC/MS
1,2-dichloroethane	1311/8260B	GC/MS
1,1-dichloroethane	1311/8260B	GC/MS

Table 2-5
Analytical Methods for Soil and Waste Samples
Quanta Resources Site
Edgewater, New Jersey

Analytical Parameter [a]	Analytical Method [b]	Instrument
2-butanone	1311/8260B	GC/MS
Tetrachloroethene	1311/8260B	GC/MS
Trichloroethene	1311/8260B	GC/MS
Vinyl Chloride	1311/8260B	GC/MS
TCLP Semivolatiles		
2-methylphenol	1311/8270C	GC/MS
3-methylphenol	1311/8270C	GC/MS
4-methylphenol	1311/8270C	GC/MS
1,4-dichlorobenzene	1311/8270C	GC/MS
2,4-dinitrotoluene	1311/8270C	GC/MS
Hexachlorobutadiene	1311/8270C	GC/MS
Hexachloroethane	1311/8270C	GC/MS
Hexachlorobenzene	1311/8270C	GC/MS
Nitrobenzene	1311/8270C	GC/MS
Pentachlorophenol	1311/8270C	GC/MS
Pyridine	1311/8270C	GC/MS
2,4,5-tichlorophenol	1311/8270C	GC/MS
2,4,6-trichlorophenol	1311/8270C	GC/MS
TCLP Pesticides		
Endrin	1311/8081A	GC/ECD
Lindane	1311/8081A	GC/ECD
Methoxychlor	1311/8081A	GC/ECD
Heptachlor	1311/8081A	GC/ECD
Toxaphene	1311/8081A	GC/ECD
Chlordane	1311/8081A	GC/ECD
TCLP Metals		
Arsenic	1311/6010B	ICP
Barium	1311/6010B	ICP
Cadmium1311/6010B	ICP	
Chromium	1311/6010B	ICP
Copper	1311/6010B	ICP
Lead	1311/6010B	ICP
Mercury	1311/7470A	Cold Vapor AA
Selenium	1311/6010B	ICP
Silver	1311/6010B	ICP
Zinc	1311/6010B	ICP

[a]Abbreviations: VOCs = volatile organic compounds;
PCBs = polychlorinated biphenyls.
TCLP = toxicity characteristic leaching procedure

[b]USEPA Office of Solid Waste and Emergency Response (OSWER), dated October 2002 and USEPA SW-846 Test Methods for Evaluating Solid Waste, Physical and Chemical, dated December 1996.

SECTION 3
ASSESSMENT AND OVERSIGHT

3.1 ASSESSMENT AND RESPONSE ACTIONS

3.1.1 Assessment

Quality assurance audits may be performed by or under the direction of the project QAO. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to Parsons corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon Parsons' procedure customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

3.1.2 System Audits

System audits, performed by the QAO or designated auditors, will encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may occur.

3.1.3 Performance Audits

The laboratory will be required to conduct an analysis of Performance Evaluation (PE) samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve (12) months.

3.1.4 Formal Audits

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Auditors who have performed the site audit after gathering and evaluating all data will write audit reports. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Noncompliance's will be logged and documented through audit findings, which are attached to and are a part of the integral audit report. These audit-finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists; audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

3.1.5 Corrective Action

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected. Corrective action forms are included in the FSP.

3.1.6 Procedure Description

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved subcontractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846 and CLP Methods.

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the Parsons office, sites, laboratories, or subcontractor locations. Activities or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit

finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) forms (See FSP). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

3.2 REPORTS TO MANAGEMENT

Parsons management personnel receive QA reports appropriate to their level of responsibility. The PM receives copies of all QA documentation. QC documentation is retained within the department that generated the product or service except where this documentation is a deliverable for a specific contract. QC documentation is also submitted to the QAO for review and approval. Previous sections detailed the QA activities and the reports that they generate. A final audit report for each project may also be prepared. The reports may include:

- periodic assessment of measurement data accuracy, precision, and completeness;
- results of performance audits and/or system audits;
- significant QA problems and recommended solutions for future projects; and
- status of solutions to any problems previously identified.

Additionally, any incidents requiring corrective action will be fully documented.

SECTION 4
DATA VALIDATION AND USABILITY ELEMENTS

4.1 DATA REVIEW, VERIFICATION, AND VALIDATION

Data validation will be performed by Parsons, in accordance with the USEPA Region 2 RCRA and CERCLA Data Validation Standard Operating Procedures (SOPs), for organic and inorganic data review. The specific SOPs listed below will be used for data validation.

- For metals, Evaluation of Metals Data for the CLP Program SOP (HW-2, Revision 11, January 1992);
- For volatiles analyzed by SW-846 Method 8260B, SOP of Validating Volatile Organic Compounds by SW-846 Method 8260B (HW-24, Revision 1, June 1999) and;
- For SVOCs analyzed by SW-846 Method 8270, SOP of Validating Semivolatile Organic Compounds by SW-846 Method 8270 (HW-22, Revision 2, June 2001).

The Region II SOP for CLP Organics Data Review and Preliminary Review (SOP HW-6, Revision 12, March 2001) will be observed when validating the organic analysis data. In addition, the data validation will be conducted under the guidelines set forth in the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (USEPA, 1999) and USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (USEPA, 2002).

Trained and experienced data validators will perform this work. The lead validator will have at least two years experience validating USEPA Region II organic data.

A data validation report will be prepared and reviewed by the QAO before issuance. The data validation report will present the results of data validation, including a summary assessment of laboratory data packages; sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each SDG will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Percentage of solids;
- Instrument tuning;
- Sample preservation and holding times;
- Instrument calibrations;
- Blank results;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;

- MS and MSD results;
- Laboratory control sample results;
- Target compound identification;
- Chromatogram quality;
- Pesticide cleanup (if applicable);
- Duplicate results;
- Compound quantitation and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;
- Percentage of solids
- Calibrations;
- Blank results;
- Sample preservatives;
- Interference control sample;
- Laboratory check samples;
- Duplicates;
- Matrix Spike;
- Furnace atomic absorption analysis QC;
- ICP serial dilutions; and
- Results verification and reported detection limits.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" - Not detected at given value;
- "UJ" - Estimated not detected at given value;
- "J" - Estimated value;
- "N" – Presumptive evidence at the value given;
- "NJ" – The analysis indicates the presence of an analyte that has been "tentatively identifies" and the associated numerical value represents its approximate concentration;
- "R" - Result not useable; and
- No Flag - Result accepted without qualification.

4.2 VERIFICATION AND VALIDATION METHODS

Records generated during field activities will be verified to ensure that field activity data is acceptable (i.e., correct sampling method was used and equipment calibrated properly). Instrument calibration logs, field notebooks and logs, and chain of custody forms will be reviewed for completeness and accuracy. A summary of all data collected will be created, and a list of any deviations and their impact on data quality.

Analytical laboratory data will be validated in accordance with the USEPA (November 2002) Guidance on Environmental Data Verification and Data Validation (QA/G-8), the USEPA Region II SOP for Data Validation, and this document. Five steps will be followed for the data validation of analytical laboratory records (USEPA November 2002).

- Assemble planning documents and data to be validated. Review data verification records to determine method, procedural, and contractual required QC compliance/non-compliance;
- Review verified, reported sample results collectively for the data set as a whole, including laboratory qualifiers;
- Summarize data and QC deficiencies and evaluate the impact on overall data quality;
- Assign data validation qualifiers as necessary; and
- Prepare analytical data validation reports.

4.3 RECONCILIATION WITH USER REQUIREMENTS

The data collected during this project will undergo a systematic review for compliance with the DQOs and performance objectives as stated in Section 1. In particular, laboratory and field data will be reviewed for compliance with the method QC criteria for performance and accuracy. The chemical data will be qualified according to USEPA Region II SOPs and reported. These data will be evaluated as to usability. In particular, data outside QC criteria, but not rejected, will be reviewed for the magnitude of possible positive and negative bias.

A data usability report, which summarizes the implications of the use of any data out of criteria, will be written for each round of data. In addition, the data usability report will include the percentage of sample completeness for critical and non-critical samples and a discussion of any issues in representativeness of the data that may develop as a result of validation. The data usability report will address overall data quality and achievement of PARCC and assess issues associated with the overall data.

After data validation in accordance to the USPEA Region II SOPs, USEPA CLP, and this QAPP, the data will be evaluated as to consistency with site conditions and developed conceptual models. All data collected will be reconciled with the requirements stated in this Work Plan and determined usable for the project goals. In cases where data may be considered not usable (i.e., rejected during data validation), resampling may be required at a specific location due to sample matrix interferences, exceedances of holding times, poor laboratory performance, etc.

SECTION 5
REFERENCES

GeoSyntec, 2000 – Removal Site Investigation Report - Revision 1, Quanta Resources Site, prepared by GeoSyntec Consultants for AlliedSignal, Inc.

GeoSyntec, 2001 – Engineering Evaluation / Cost Analysis (EE/CA) Analysis Report - Revision 2, Quanta Resources Site, prepared by GeoSyntec Consultants for AlliedSignal, Inc.

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ATTACHMENT A

Chemical ARARs and TBCs

USEPA MCLs

EPA National Primary Drinking Water Standards

	Contaminant	MCL or TT1 (mg/L)2	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Acrylamide	TT8	Nervous system or blood problems;	Added to water during sewage/wastewater increased risk of cancer treatment	zero
OC	Alachlor	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops	zero
R	Alpha particles	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	zero
IOC	Antimony	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	0.006
IOC	Arsenic	0.010 as of 1/23/06	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards, runoff from glass & electronics production wastes	0
IOC	Asbestos (fibers >10 micrometers)	7 million fibers per Liter (MFL)	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits	7 MFL
OC	Atrazine	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops	0.003
IOC	Barium	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	2
OC	Benzene	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills	zero
OC	Benzo(a)pyrene (PAHs)	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines	zero
IOC	Beryllium	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	0.004
R	Beta particles and photon emitters	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation	zero
DBP	Bromate	0.010	Increased risk of cancer	Byproduct of drinking water disinfection	zero
IOC	Cadmium	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	0.005
OC	Carbofuran	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa	0.04
OC	Carbon tetrachloride	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities	zero
D	Chloramines (as Cl_2)	MRDL=4.01	Eye/nose irritation; stomach discomfort, anemia	Water additive used to control microbes	MRDLG=41

LEGEND

D	Dinsinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

	Contaminant	MCL or TT1 (mg/L)2	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Chlordane	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide	zero
D	Chlorine (as Cl_2)	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort	Water additive used to control microbes	MRDLG=4[1]
D	Chlorine dioxide (as ClO_2)	MRDL=0.8[1]	Anemia; infants & young children: nervous system effects	Water additive used to control microbes	MRDLG=0.8[1]
DBP	Chlorite	1.0	Anemia; infants & young children: nervous system effects	Byproduct of drinking water disinfection	0.8
OC	Chlorobenzene	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories	0.1
IOC	Chromium (total)	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits	0.1
IOC	Copper	TT7; Action Level = 1.3	Short term exposure: Gastrointestinal distress. Long term exposure: Liver or kidney damage. People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits	1.3
M	*Cryptosporidium*	TT3	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
IOC	Cyanide (as free cyanide)	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories	0.2
OC	2,4-D	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops	0.07
OC	Dalapon	0.2	Minor kidney changes	Runoff from herbicide used on rights of way	0.2
OC	1,2-Dibromo-3-chloropropane (DBCP)	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards	zero
OC	o-Dichlorobenzene	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories	0.6
OC	p-Dichlorobenzene	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories	0.075
OC	1,2-Dichloroethane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC	1,1-Dichloroethylene	0.007	Liver problems	Discharge from industrial chemical factories	0.007
OC	cis-1,2-Dichloroethylene	0.07	Liver problems	Discharge from industrial chemical factories	0.07
OC	trans-1,2-Dichloroethylene	0.1	Liver problems	Discharge from industrial chemical factories	0.1
OC	Dichloromethane	0.005	Liver problems; increased risk of cancer	Discharge from drug and chemical factories	zero
OC	1,2-Dichloropropane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC	Di(2-ethylhexyl) adipate	0.4	Weight loss, live problems, or possible reproductive difficulties	Discharge from chemical factories	0.4
OC	Di(2-ethylhexyl) phthalate	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories	zero
OC	Dinoseb	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables	0.007
OC	Dioxin (2,3,7,8-TCDD)	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories	zero
OC	Diquat	0.02	Cataracts	Runoff from herbicide use	0.02
OC	Endothall	0.1	Stomach and intestinal problems	Runoff from herbicide use	0.1

LEGEND

D Dinsinfectant | DBP Disinfection Byproduct | IOC Inorganic Chemical | M Microorganism | OC Organic Chemical | R Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Endrin	0.002	Liver problems	Residue of banned insecticide	0.002
OC	Epichlorohydrin	TT[8]	Increased cancer risk, and over a long period of time, stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals	zero
OC	Ethylbenzene	0.7	Liver or kidneys problems	Discharge from petroleum refineries	0.7
OC	Ethylene dibromide	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries	zero
IOC	Fluoride	4.0	Bone disease (pain and tenderness of the bones); Children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories	4.0
M	*Giardia lamblia*	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
OC	Glyphosate	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use	0.7
DBP	Haloacetic acids (HAA5)	0.060	Increased risk of cancer	Byproduct of drinking water disinfection	n/a[6]
OC	Heptachlor	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide	zero
OC	Heptachlor epoxide	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor	zero
M	Heterotrophic plate count (HPC)	TT[3]	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment	n/a
OC	Hexachlorobenzene	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories	zero
OC	Hexachlorocyclopentadiene	0.05	Kidney or stomach problems	Discharge from chemical factories	0.05
IOC	Lead	TT[7]; Action Level = 0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities; Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits	zero
M	*Legionella*	TT[3]	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems	zero
OC	Lindane	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens	0.0002
IOC	Mercury (inorganic)	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands	0.002
OC	Methoxychlor	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock	0.04
IOC	Nitrate (measured as Nitrogen)	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	10
IOC	Nitrite (measured as Nitrogen)	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	1

LEGEND

D Dinsinfectant | IOC Inorganic Chemical | OC Organic Chemical

DBP Disinfection Byproduct | M Microorganism | R Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Oxamyl (Vydate)	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes	0.2
OC	Pentachlorophenol	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood preserving factories	zero
OC	Picloram	0.5	Liver problems	Herbicide runoff	0.5
OC	Polychlorinated biphenyls (PCBs)	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals	zero
R	Radium 226 and Radium 228 (combined)	5 pCi/L	Increased risk of cancer	Erosion of natural deposits	zero
IOC	Selenium	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines	0.05
OC	Simazine	0.004	Problems with blood	Herbicide runoff	0.004
OC	Styrene	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills	0.1
OC	Tetrachloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners	zero
IOC	Thallium	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories	0.0005
OC	Toluene	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories	1
M	Total Coliforms (including fecal coliform and *E. coli*)	5.0%[4]	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present[5]	Coliforms are naturally present in the environment as well as feces; fecal coliforms and *E. coli* only come from human and animal fecal waste.	zero
DBP	Total Trihalomethanes (TTHMs)	0.10 0.080 after 12/31/03	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	n/a[6]
OC	Toxaphene	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle	zero
OC	2,4,5-TP (Silvex)	0.05	Liver problems	Residue of banned herbicide	0.05
OC	1,2,4-Trichlorobenzene	0.07	Changes in adrenal glands	Discharge from textile finishing factories	0.07
OC	1,1,1-Trichloroethane	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories	0.20
OC	1,1,2-Trichloroethane	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories	0.003
OC	Trichloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories	zero
M	Turbidity	TT[3]	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (e.g., whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing micro-organisms such as viruses, parasites and some bacteria. These organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff	n/a
R	Uranium	30 ug/L as of 12/08/03	Increased risk of cancer, kidney toxicity	Erosion of natural deposits	zero

LEGEND

D Disinfectant
DBP Disinfection Byproduct
IOC Inorganic Chemical
M Microorganism
OC Organic Chemical
R Radionuclides

	Contaminant	MCL or TT1 (mg/L)2	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Vinyl chloride	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories	zero
M	Viruses (enteric)	TT3	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
OC	Xylenes (total)	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories	10

NOTES

1 Definitions

- Maximum Contaminant Level Goal (MCLG)—The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
- Maximum Contaminant Level (MCL)—The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
- Maximum Residual Disinfectant Level Goal (MRDLG)—The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- Maximum Residual Disinfectant Level (MRDL)—The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- Treatment Technique (TT)—A required process intended to reduce the level of a contaminant in drinking water.

2 Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (ppm).

3 EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- *Cryptosporidium* (as of 1/1/02 for systems serving >10,000 and 1/14/05 for systems serving <10,000) 99% removal.
- *Giardia lamblia*: 99.9% removal/inactivation
- Viruses: 99.99% removal/inactivation
- *Legionella*: No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated, *Legionella* will also be controlled.
- Turbidity: At no time can turbidity (cloudiness of water) go above 5 nephelolometric turbidity units (NTU); systems that filter must ensure that the turbidity go no higher than 1 NTU (0.5 NTU for conventional or direct filtration) in at least 95% of the daily samples in any month. As of January 1, 2002, for systems servicing >10,000, and January 14, 2005, for systems servicing <10,000, turbidity may never exceed 1 NTU, and must not exceed 0.3 NTU in 95% of daily samples in any month.
- HPC: No more than 500 bacterial colonies per milliliter
- Long Term 1 Enhanced Surface Water Treatment (Effective Date: January 14, 2005); Surface water systems or (GWUDI) systems serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (e.g. turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).
- Filter Backwash Recycling: The Filter Backwash Recycling Rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

4 No more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or *E. coli* if two consecutive TC-positive samples, and one is also positive for *E. coli* fecal coliforms, system has an acute MCL violation.

5 Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.

6 Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

- Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.3 mg/L)
- Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L)

7 Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.

8 Each water system must certify, in writing, to the state (using third-party or manufacturers certification) that when it uses acrylamide and/or epichlorohydrin to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows: Acrylamide = 0.05% dosed at 1 mg/L (or equivalent); Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent).

LEGEND

D	Dinsinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

National Secondary Drinking Water Standards

National Secondary Drinking Water Standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards.

Contaminant	Secondary Standard
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

Office of Water (4606M)
EPA 816-F-03-016
www.epa.gov/safewater
June 2003

New Jersey MCLs

Federal & New Jersey Drinking Water Standards

Federal and New Jersey state Primary and Secondary Drinking Water Standards as of February, 2005

Trihalomethanes 80µg/l [ppb] annual running average. Total of Dichlorobromomethane, Chlorodibromomethane, Bromoform and Chloroform.

Radionuclides are elements such as radium and uranium. Combined radium 226 and radium 228 has an MCL of 5 picocuries/liter (pCi/l). The MCL for gross alpha particle activity [including radium 226 but excluding radon and uranium] is 15 pCi/l, beta/photon emitters MCL is 4 mrem/yr, and uranium MCL is 30 µg/l.

Turbidity is measured by use of an instrument called a nephelometer, and expressed as nephelometric turbidity units [NTU] No more than 5% of the samples may exceed 0.3 NTU, nor any sample may exceed 1 NTU.

Coliform bacteria standards are based on the presence or absence of coliforms in a sample. The number of samples collected by a public water system is determined by the size of the population served. A system collecting at least 40 samples/month can have coliform in no more than 5% of the samples. A system collecting fewer than 40 samples/month can have no more than one coliform positive. Any number exceeding these amounts triggers an MCL exceedance.

Haloacetic Acids 60 µg/l ppb running annual average Total of Monochloroacetic, Dichloroacetic, Trichloroacetic, Bromoacetic and Dibromoacetic acids.

Bromate (plants using ozone) 10 µg/l (ppb) running annual average.

Chlorite (plants using chlorine dioxide) 1,000 µg/l (ppb) daily/follow-up monitoring.

- Inorganics
- Synthetic Organic Compounds
- Volatile Organic Compounds
- Secondary Standards [primarily aesthetic]

Inorganics

Contaminants	Maximum Contaminant Level MCL[µg/l or ppb]
Antimony	6
Arsenic	5*#
Asbestos	7x 10E6 fibers/l > 10µm
Barium	2000
Beryllium	4
Cadmium	5
Chromium	100
Copper	1300**[AL
Cyanide	200
Fluoride	4000
Lead	15**[AL
Mercury	2
Nitrate[as nitrogen]	10000
Nitrite	1000
[combined nitrate/nitrite	10000]
Selenium	50
Thallium	2
Nickel	+

* NJ MCL (A 280).
** An action level [AL] is not an MCL. It is a trigger point at which remedial action is to take place.
+ No MCL-Monitoring Required.
# Effective January 23, 2006.

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Synthetic Organic Compounds

Contaminants	MCL [µg/l or ppb]
Alachlor	2
Aldicarb	+
Aldicarb Sulfore	+
Aldicarb Sulfoxide	+
Atrazine	3
Benzo[a]pyrene	0.2
Carbofuran	40
Chlordane	0.5*
Dalapon	200

Dibromochloropropane [DBCP]	0.2
Di[2-ethylhexyl]adipate	400
Di[2-ethylhexyl]phthalate	6
Dinoseb	7
Diquat	20
Endothall	100
Endrin	2
Ethylene dibromide [EDB]	0.05
Glyphosate	700
Heptachlor	0.4
Heptachlor Epoxide	0.2
Hexachlorobenzene	1
Hexachlorocyclopentadiene	50
Lindane	0.2
Methoxychlor	40
Oxamyl	200
PCBs	0.5
Pentachlorophenol	1
Picloram	500
Simazine	4
Toxaphene	3
2,3,7,8-TCDD [Dioxin]	3 X 10E-5
2,4-D	70
2,4,5-TP [Silvex]	50

* N.J. MCL [A-280]
+ No MCL-Monitoring Required

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Volatile Organic Compounds

Contaminants	MCL [µg/l or ppb]
Benzene	1*
Carbon Tetrachloride	2*
meta-Dichlorobenzene	600*
ortho-Dichlorobenzene	600
para-Dichlorobenzene	75
1,1-Dichloroethane	50*
1,2-Dichloroethane	2*

1,1-Dichloroethylene	2*
cis-1,2-Dichloroethylene	70
trans-1,2-Dichloroethylene	100
1,2-Dichloropropane	5
Ethylbenzene	700
Methyl tertiary Butyl Ether	70*
Methylene Chloride	3*
Monochlorobenzene	50*
Naphthalene	300*
Styrene	100
1,1,2,2-Tetrachloroethane	1*
Tetrachloroethylene	1*
Toluene	1000
1,2,4-Trichlorobenzene	9*
1,1,1-Trichloroethane	30*
1,1,2-Trichloroethane	3*
Trichloroethylene	1*
Vinyl Chloride	2
Xylenes [total]	1000*

* N.J. MCL [A-280]

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Secondary Standards [primarily aesthetic]

Physical Characteristics	Recommended Upper Limit or Optimum Range
Color	10 color units (standard cobalt scale)
pH	6.5 to 8.5 (optimum range)
Odor	3 Threshold odor number
Taste	No objectional taste
Chemical Characteristics	Recommended Upper Limit (mg/l or ppm)
ABS/L.A.S.	0.5
Aluminum	0.2
Chloride	250
Fluoride	2
Hardness (as CaCO3)	250
Iron	0.3
Manganese	0.05

Silver	0.1
Sodium	50
Sulfate	250
Total dissolved solids	500
Zinc	5

NJDEP

Ground Water Quality Criteria (NJGWQC)

Constituent	CASRN	Ground Water Quality Criteria (ug/L)	Practical Quantitation Levels (PQLs)	Higher of PQLs and Ground Water Quality Criteria
Acenaphthene	83-32-9	400	10	400
Acenapthylene	208-96-8	NA	10	NA
Acetone	67-64-1	700	NA	700
Acrolein	107-02-8	NA	50	NA
Acrylamide	79-06-1	0.008	NA	0.008
Acrylonitrile	107-13-1	0.06	50	50
Adipates (Di(ethylhexyl)adipate)	103-23-1	NA	6	NA
Alachlor	15972-60-8	0.43	2	2
Aldicarb sulfone	1646-88-4	2	3	3
Aldrin	309-00-2	0.002	0.04	0.04
Aluminum	7429-90-5	200	200	200
Ammonia		500	200	500
Anthracene	120-12-7	2000	10	2000
Antimony	7440-36-0	2	20	20
Arsenic (Total)	7440-38-2	0.02	8	8
Asbestos	1332-21-4	$7X10^6$f/L>10 um[a]	10^5f/L>10um[a]	$7X10^6$f/L>10um[a]
Atrazine	1912-24-9	3	1	3
Barium	7440-39-3	2,000	200	2000
Benz(a)anthracene	56-55-3	NA	10	NA
Benzene	71-43-2	0.2	1	1
Benzidine	92-87-5	0.0002	50	50
Benzyl Alcohol	100-51-6	2000	NA	2000
Benzo(a)pyrene (BaP)	50-32-8	NA	20	NA
3,4-Benzofluoranthene (Benzo(b)fluoranthene)	205-99-2	NA	10	NA
Benzo(ghi)perylene	191-24-2	NA	20	NA
Benzo(k)fluoranthene	207-08-9	NA	2	NA
Beryllium	7440-41-7	0.008	20	20
alpha-BHC (alpha-HCH)	319-84-6	0.006	0.02	0.02
beta-BHC (beta-HCH)	319-85-7	0.2	0.04	0.2
gamma-BHC (gamma-HCH/Lindane)	58-89-9	0.2	0.2	0.2
Bis(2-chloroethyl) ether	111-44-4	0.03	10	10
Bis(2-chloroisopropyl) ether	39638-32-9	300	10	300
Bis(2-ethylhexyl) phthalate	117-81-7	3	30	30
Bromodichloromethane				
(Dichlorobromomethane)	75-27-4	0.3	1	1
Bromoform	75-25-2	4	0.8	4
Butylbenzyl phthalate	85-68-7	100	20	100
Cadmium	7440-43-9	4	2	4
Carbofuran	1563-66-2	40	7	40
Carbon tetrachloride	56-23-5	0.4	2	2
Chlorobenzene	108-90-7	4	2	4
Chlordane	57-74-9	0.01	0.5	0.5
Chloride	16887-00-6	250,000	2000	250,000
Chloroform	67-66-3	6	1	6

4-Chloro-3-methyl				
(o-chloro-m-cresol)	59-50-7	NA	20	NA
2-Chlorophenol	95-57-8	40	20	40
Chlorpyrifos	2921-88-2	20	0.2	20
Chromium (Total)	7440-47-3	100	10	100
Chrysene	218-01-9	NA	20	NA
Color		10 CU	20 CU	20 CU
Copper	7440-50-8	1,000	1,000	1,000
Cyanide	57-12-5	200	40	200
2,4-D	94-75-7	70	5	70
Dalapon	75-99-0	200	10	200
4,4'-DDD (p,p'-TDE)	72-54-8	0.1	0.04	0.1
4,4'-DDE	72-55-9	0.1	0.04	0.1
4,4'-DDT	50-29-3	0.1	0.06	0.1
Demeton	8065-48-3	0.3	NA	0.3
Dibenz(a,h)anthracene	53-70-3	NA	20	NA
Dibromochloromethane				
(Chlorodibromomethane)	124-48-1	10	1	10
1,2-Dibromo-3-chloropropane				
(DBCP)	96-12-8	NA	2	NA
Di-n-butyl phthalate	84-74-2	900	20	900
1,2-Dichlorobenzene	95-50-1	600	5	600
1,3-Dichlorobenzene	541-73-1	600	5	600
1,4-Dichlorobenzene	106-46-7	75	5	75
3,3'-Dichlorobenzidine	91-94-1	0.08	60	60
1,1-Dichloroethane	75-34-3	70	NA	70
1,2-Dichloroethane	107-06-2	0.3	2	2
1,1-Dichloroethylene	75-35-4	1	2	2
cis-1,2-Dichloroethylene	156-59-2	10	2	10
trans-1,2-Dichloroethylene	156-60-5	100	2	100
2,4-Dichlorophenol	120-83-2	20	10	20
1,2-Dichloropropane	78-87-5	0.5	1	1
cis-1,3-Dichloropropene	10061-01-5	NA	5	NA
trans-1,3Dichlorpropene	10061-02-6	NA	7	NA
1,3-Dichloropropene				
(cis and trans)	542-75-6	0.2	NA	.02
Dieldrin	60-57-1	0.002	0.03	0.03
Diethyl phthalate	84-66-2	5,000	10	5,000
2,4-Dimethylphenol	105-67-9	100	20	100
Dimethyl phthalate	131-11-3		10	
4,6-Dinitro-o-cresol	534-52-1	NA	60	NA
2,4-Dinitrophenol	51-28-5	10	40	40
2,4-Dinitrotoluene				
/2,6-Dinitrotoluene mixture	121-14-2	0.05	10	10
2,6-Dinitrotoluene	606-20-2	NA	10	NA
Di-n-octyl phthalate	117-84-0	100	NA	100
Dinoseb	88-85-7	7	2	7
1,2-Diphenylhydrazine	122-66-7	0.04	NA	0.04
Diquat	85-00-7	20	NA	20
Endosulfan	115-29-7	0.4	NA	0.4
alpha-Endosulfan				

(Endosulfan I)	959-98-8	0.4	0.02	0.4
beta-Endosulfan (EndosulfanII)	33213-65-9	0.4	0.04	0.4
Endosulfan sulfate	1031-07-8	0.4	0.08	0.4
Endothall	145-73-3	100	NA	100
Endrin	72-20-8	2	0.04	2
Epichlorohydrin	106-89-8	4	NA	4
Ethylbenzene	100-41-4	700	5	700
Ethylene dibromide	106-93-4	0.0004	0.05	0.05
Fluoranthene	206-44-0	300	10	300
Fluorene	86-73-7	300	10	300
Fluoride	16984-48-8	2000	500	2000
Foaming agents (ABS/LAS)		500	0.5	500
Glyphosate	1071-83-6	700	NA	700
Hardness (as $CaCO_3$)		250mg/L	10 mg/L	250 mg/L
Heptachlor	76-44-8	0.008	0.4	0.4
Heptachlor epoxide	1024-57-3	0.004	0.2	0.2
Hexachlorobenzene	118-74-1	0.02	10	10
Hexachlorobutadiene	87-68-3	1	1	1
Hexachlorocyclopentadiene	77-47-4	50	10	50
Hexachloroethane	67-72-1	0.7	10	10
Hydrogen sulfide	7783-06-4	20	NA	20
Indeno(1,2,3-cd)pyrene	193-39-5	NA	20	NA
Iron	7439-89-6	300	100	300
Isophorone	78-59-1	100	10	100
Lead (Total)	7439-92-1	5	10	10
Malathion	121-75-5	200	5	200
Manganese	7439-96-5	50	6	50
Mercury (Total)	7439-97-6	2	0.5	2
Methoxychlor	72-43-5	40	10	40
Methyl bromide (bromomethane)	74-83-9	10	2	10
Methyl chloride (chloromethane)	74-87-3	30	2	30
Methyl ethyl ketone	78-93-3	300	NA	300
3-Methyl-4-chlorophenol	59-50-7	NA	20	NA
Methylene chloride	75-09-2	2	2	2
4-Methyl-2-pentanone	108-10-1	400	NA	400
Mirex	2385-85-5	0.01	NA	0.01
Nickel (Soluble salts)	7440-02-0	100	10	100
Nitrate (as N)	14797-55-8	10,000	400	10,000
Nitrate and Nitrite (as N)		10,000	NA	10,000
Nitrite (as N)	14797-65-0	1,000	400	1,000
Nitrobenzene	98-95-3	3	10	10
N-Nitrosodimethylamine	62-75-9	0.0007	20	20
N-Nitrosodiphenylamine	86-30-6	7	20	20
N-Nitrosodi-n-propylamine	621-64-7	0.005	20	20
Odor		3[b]	NA	3[b]
Oil & Grease and Petroleum Hydrocarbons (PHC)		None Noticeable	NA	None Noticeable

Oxamyl	23135-22-0	200	20	200
PCBs				
(Polychlorinated biphenyls)	1336-36-3	0.02	0.5	0.5
Pentachlorophenol	87-86-5	0.3	1	1
pH		6.5-8.5	NA	6.5-8.5
Phenanthrene	85-01-8	NA	10	NA
Phenol	108-95-2	4000	10	4000
Picloram	1918-02-1	500	1	500
Pyrene	129-00-0	200	20	200
Selenium (Total)	7782-49-2	50	10	50
Silver	7440-22-4	NA	2	NA
Simazine	122-34-9	1	0.8	1
Sodium	7440-23-5	50,000	400	50,000
Styrene	100-42-5	100	5	100
Sulfate	14808-79-8	250,000	5000	250,000
Taste		None Objectionable	NA	None Objectionable
TCDD				
(2,3,7,8-Tetrachlorodibenzo				
-p-dioxin)	1746-01-6	0.0000002	0.01	0.01
1,1,1,2-Tetrachloroethane	630-20-6	10	NA	10
1,1,2,2-Tetrachloroethane	79-34-5	2	1	2
Tetrachloroethylene	127-18-4	0.4	1	1
2,3,4,6-Tetrachlorophenol	58-90-2	NA	10	NA
Thallium	7440-28-0	0.5	10	10
Toluene	108-88-3	1,000	5	1000
Total dissolved solids (TDS)		500,000	10,000	500,000
Toxaphene	8001-35-2	0.03	3	3
2,4,5-TP	93-72-1	50	5	50
1,2,4-Trichlorobenzene	120-82-1	9	1	9
1,1,1-Trichloroethane	71-55-6	30	1	30
1,1,2-Trichloroethane	79-00-5	3	2	3
Trichloroethylene	79-01-6	1	1	1
2,4,5-Trichlorophenol	95-95-4	700	10	700
2,4,6-Trichlorophenol	88-06-2	3	20	20
Vinylchloride	75-01-4	0.08	5	5
Xylenes (Total)	1330-20-7	40	2	40
m&p-Xylenes	NA	NA	2	NA
o-Xylene	NA	NA	1	NA
Zinc	7440-66-6	5,000	30	5000
Microbiological criteria[m], Radionuclides & Turbidity		prevailing Safe Drinking Water Act Regulations (N.J.A.C. 7:10-1 et seq.)		

Explanation of Terms:

* = Ground Water Quality Criteria and PQLs are expressed as ug/L unless otherwise noted. Table 1 criteria are all maximum values unless clearly indicated as a range for which the minimum value is to the left and the maximum value is to the right.

PQL -- Practical Quantitation Level as defined in N.J.A.C. 7:9-6.4

CASRN - Chemical Abstracts System Registration Number

NA = not available for this constituent.
a = Asbestos criterion is measured in terms of fibers/L longer than 10 micrometers (f/L > 10 um)
ug = micrograms, L = liter, f = fibers, CU= Standard Cobalt Units
b = Odor Threshold Number, mg = milligrams, H = Hardness
(Total) means the concentration of metal in an unfiltered sample following treatment with hot dilute mineral acid (as defined in "Methods for Chemical Analysis of Water & Wastes", EPA-600/4-79-020, March 1979) or other digestion defined by the analytical method. However samples that contain less than 1 nephlometric turbidity unit (NTU) and are properly preserved, may be directly analyzed without digestion.
m= Pursuant to prevailing Safe Drinking Water Act Regulations any positive result for fecal coliform is in violation of the MCL and is therefore an exceedance of the ground water quality standards.

TABLE 2
INTERIM GENERIC GROUND WATER QUALITY CRITERIA

Interim Generic Criteria--Synthetic Organic Chemicals (SOC)*

Constituent	Water Quality Criteria
SOCs with evidence of carcinogenicity lacking specific or interim specific criteria	5 ug/l each 25 ug/l total
SOCs lacking evidence of carcinogenicity lacking specific or interim specific criteria	100 ug/l each 500 ug/l total

* SOCs are identified as having "evidence of carcinogenicity" or "lacking evidence of carcinogenicity" based upon available scientific evidence. Chemicals are classified as carcinogens or noncarcinogens for the purposes of risk assessment according to the weight of evidence utilized by USEPA in the National Primary Drinking Water Regulations (50 FR 46880-46901 (1985)).

USEPA Region 9

Preliminary Remediation Goals (PRGs)

Key : SFo,i=Cancer Slope Factor oral, inhalation RfDo,i=Reference Dose oral, inhalation i=IRIS p=PPRTV c=California EPA h=NCEA h*=HEAST x=Withdrawn r=Route-extrapolation ca=Cancer PRG nc= Noncancer PRG ca* (where: nc PRG < 100X ca PRG)
ca** (where nc PRG < 10X ca PRG) +++=Non-Standard Method Applied (See User's Guide) sat=Soil Saturation (See User's Guide) max=Ceiling limit (See User's Guide) DAF=Dilution Attenuation Factor (See User's Guide) CAS=Chemical Abstract Services

TOXICITY VALUES									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C / skin abs. / soils / CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
8.7E-03	i	4.0E-03	i	8.7E-03	r	4.0E-03	r	0.1 30560-19-1	Acephate	5.6E+01	ca**	2.0E+02	ca*	7.7E-01	ca*	7.7E+00	ca*		
				7.7E-03	i	2.6E-03	i	y 75-07-0	Acetaldehyde	1.1E+01	ca**	2.3E+01	ca**	8.7E-01	ca*	1.7E+00	ca		
		2.0E-02	i			2.0E-02	r	0.1 34256-82-1	Acetochlor	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		9.0E-01	i			9.0E-01	r	y 67-64-1	**Acetone**	1.4E+04	nc	5.4E+04	nc	3.3E+03	nc	5.5E+03	nc	1.6E+01	8.0E-01
		8.0E-04	h			8.0E-04	r	0.1 75-86-5	Acetone cyanohydrin	4.9E+01	nc	4.9E+02	nc	2.9E+00	nc	2.9E+01	nc		
		1.7E-02	r			1.7E-02	i	y 75-05-8	Acetonitrile	4.2E+02	nc	1.8E+03	nc	6.2E+01	nc	1.0E+02	nc		
		5.0E-04	i			5.7E-06	i	y 107-02-8	**Acrolein**	1.0E-01	nc	3.4E-01	nc	2.1E-02	nc	4.2E-02	nc		
4.5E+00	i	2.0E-04	i	4.5E+00	i	2.0E-04	r	0.1 79-06-1	Acrylamide	1.1E-01	ca	3.8E-01	ca	1.5E-03	ca	1.5E-02	ca		
		5.0E-01	i			2.9E-04	i	0.1 79-10-7	Acrylic acid	2.9E+04	nc	1.0E+05	max	1.0E+00	nc	1.8E+04	nc		
5.4E-01	i	1.0E-03	h	2.4E-01	i	5.7E-04	i	y 107-13-1	Acrylonitrile	2.1E-01	ca*	4.9E-01	ca*	2.8E-02	ca*	3.9E-02	ca*		
1.0E+00	r			1.0E+00	c			y	**"CAL-Modified PRG"**	5.5E-02	ca	1.2E-01	ca	6.7E-03	ca	1.1E-02	ca		
8.1E-02	h	1.0E-02	i	8.0E-02	r	1.0E-02	r	0.1 15972-60-8	Alachlor	6.0E+00	ca	2.1E+01	ca	8.4E-02	ca	8.4E-01	ca		
		1.5E-01	i			1.5E-01	r	0.1 1596-84-5	Alar	9.2E+03	nc	9.2E+04	nc	5.5E+02	nc	5.5E+03	nc		
		1.0E-03	i			1.0E-03	r	0.1 116-06-3	Aldicarb	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
		1.0E-03	i			1.0E-03	r	0.1 1646-88-4	Aldicarb sulfone	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
1.7E+01	i	3.0E-05	i	1.7E+01	i	3.0E-05	r	0.1 309-00-2	Aldrin	2.9E-02	ca*	1.0E-01	ca	3.9E-04	ca	4.0E-03	ca	5.0E-01	2.0E-02
		2.5E-01	i			2.5E-01	r	0.1 74223-64-6	Ally	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		5.0E-03	i			5.0E-03	r	0.1 107-18-6	Allyl alcohol	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.9E-04	r			2.9E-04	i	0.1 107-05-1	**Allyl chloride**	1.7E+01	nc	1.8E+02	nc	1.0E+00	nc	1.0E+01	nc		
		1.0E+00	p			1.4E-03	p	7429-90-5	Aluminum	7.6E+04	nc	1.0E+05	max	5.1E+00	nc	3.6E+04	nc		
		4.0E-04	i					20859-73-8	*Aluminum phosphide*	3.1E+01	nc	4.1E+02	nc			1.5E+01	nc		
		3.0E-04	i			3.0E-04	r	0.1 67485-29-4	Amdro	1.8E+01	nc	1.8E+02	nc	1.1E+00	nc	1.1E+01	nc		
		9.0E-03	i			9.0E-03	r	0.1 834-12-8	Ametryn	5.5E+02	nc	5.5E+03	nc	3.3E+01	nc	3.3E+02	nc		
		2.0E-04	n			2.0E-04	r	0.1 1321-12-6	**Aminodinitrotoluene**	1.2E+01	nc	1.2E+02	nc	7.3E-01	nc	7.3E+00	nc		
		7.0E-02	h			7.0E-02	r	0.1 591-27-5	m-Aminophenol	4.3E+03	nc	4.3E+04	nc	2.6E+02	nc	2.6E+03	nc		
		2.0E-05	h			2.0E-05	r	0.1 504-24-5	*4-Aminopyridine*	1.2E+00	nc	1.2E+01	nc	7.3E-02	nc	7.3E-01	nc		
		2.5E-03	i			2.5E-03	r	0.1 33089-61-1	Amitraz	1.5E+02	nc	1.5E+03	nc	9.1E+00	nc	9.1E+01	nc		
						2.9E-02	i	7664-41-7	Ammonia					1.0E+02	nc				
		2.0E-01	i					0.1 7773-06-0	Ammonium sulfamate	1.2E+04	nc	1.0E+05	max			7.3E+03	nc		
5.7E-03	i	7.0E-03	p	5.7E-03	r	2.9E-04	i	0.1 62-53-3	Aniline	8.5E+01	ca**	3.0E+02	ca*	1.0E+00	nc	1.2E+01	ca*		
		4.0E-04	i					7440-36-0	*Antimony and compounds*	3.1E+01	nc	4.1E+02	nc			1.5E+01	nc	5.0E+00	3.0E-01
		1.3E-02	i			1.3E-02	r	0.1 74115-24-5	Apollo	7.9E+02	nc	8.0E+03	nc	4.7E+01	nc	4.7E+02	nc		
2.5E-02	i	5.0E-02	h	2.5E-02	i	5.0E-02	r	0.1 140-57-8	Aramite	1.9E+01	ca	6.9E+01	ca	2.7E-01	ca	2.7E+00	ca		
1.5E+00	i	3.0E-04	i	1.5E+01	i			0.03 7440-38-2	Arsenic	3.9E-01	ca*	1.6E+00	ca	4.5E-04	ca	4.5E-02	ca	2.9E+01	1.0E+00
9.5E+00	c			1.2E+01	c			0.03	**"CAL-Modified PRG"**	6.2E-02	ca	2.5E-01	ca	5.6E-04	ca	7.1E-03	ca		
						1.4E-05	i	7784-42-1	*Arsine (see arsenic for cancer endpoint)*					5.2E-02	nc				
		9.0E-03	i			9.0E-03	r	0.1 78578-14-8	Assure	5.5E+02	nc	5.5E+03	nc	3.3E+01	nc	3.3E+02	nc		
		5.0E-02	i			5.0E-02	r	0.1 3337-71-1	Asulam	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
2.2E-01	h	3.5E-02	i	2.2E-01	r	3.5E-02	r	0.1 1912-24-9	Atrazine	2.2E+00	ca	7.8E+00	ca	3.1E-02	ca	3.0E-01	ca		
		4.0E-04	i			4.0E-04	r	0.1 71751-41-2	Avermectin B1	2.4E+01	nc	2.5E+02	nc	1.5E+00	nc	1.5E+01	nc		
1.1E-01				1.1E-01	i			0.1 103-33-3	Azobenzene	4.4E+00	ca	1.6E+01	ca	6.2E-02	ca	6.1E-01	ca		
		7.0E-02	i			1.4E-04	h	7440-39-3	Barium and compounds	5.4E+03	nc	6.7E+04	nc	5.2E-01	nc	2.6E+03	nc	1.6E+03	8.2E+01

Key : SFo,I=Cancer Slope Factor oral, Inhalation RfDo,I=Reference Dose oral, Inhalation i=IRIS p=PPRTV c=California EPA n=NCEA h=HEAST x=Withdrawn r=Route-extrapolation ca=Cancer PRG nc= Noncancer PRG ca* (where: nc PRG < 100X ca PRG). ca** (where nc PRG < 10X ca PRG) +++=Non-Standard Method Applied (See User's Guide) sat=Soil Saturation (See User's Guide) max=Ceiling limit (See User's Guide) DAF=Dilution Attenuation Factor (See User's Guide) CAS=Chemical Abstract Services

TOXICITY VALUES								CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)					Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		4.0E-03	I			4.0E-03	r	0.1 114-26-1	Baygon		2.4E+02	nc	2.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
		3.0E-02	I			3.0E-02	r	0.1 43121-43-3	Bayleton		1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc		
		2.5E-02	I			2.5E-02	r	0.1 68359-37-5	Baythroid		1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc		
		3.0E-01	I			3.0E-01	r	0.1 1861-40-1	Benefin		1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		
		5.0E-02	I			5.0E-02	r	0.1 17804-35-2	Benomyl		3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
		3.0E-02	I			3.0E-02	r	0.1 25057-89-0	Bentazon		1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc		
		1.0E-01	I			1.0E-01	r	0.1 100-52-7	Benzaldehyde		6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc		
5.5E-02	i	4.0E-03	i	2.7E-02	I	8.6E-03	I	y 71-43-2	**Benzene**		6.4E-01	ca*	1.4E+00	ca*	2.5E-01	ca	3.5E-01	ca	3.0E-02	2.0E-03
2.3E+02	i	3.0E-03	I	2.3E+02	I	3.0E-03	r	0.1 92-87-5	Benzidine		2.1E-03	ca	7.5E-03	ca	2.9E-05	ca	2.9E-04	ca		
		4.0E+00	I			4.0E+00	r	0.1 65-85-0	Benzoic acid		1.0E+05	max	1.0E+05	max	1.5E+04	nc	1.5E+05	nc	4.0E+02	2.0E+01
1.3E+01	I			1.3E+01	r			0.1 98-07-7	Benzotrichloride		3.7E-02	ca	1.3E-01	ca	5.2E-04	ca	5.2E-03	ca		
		3.0E-01	h			3.0E-01	r	0.1 100-51-6	Benzyl alcohol		1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		
1.7E-01	I	2.9E-03	r	1.7E-01	r	2.9E-03	n	y 100-44-7	Benzyl chloride		8.9E-01	ca*	2.2E+00	ca	4.0E-02	ca	6.6E-02	ca		
		2.0E-03	I	8.4E+00	I	5.7E-06	I	7440-41-7	Beryllium and compounds		1.5E+02	nc	1.9E+03	ca**	8.0E-04	ca*	7.3E+01	nc	6.3E+01	3.0E+00
		1.0E-04	I			1.0E-04	r	0.1 141-66-2	Bidrin		6.1E+00	nc	6.2E+01	nc	3.7E-01	nc	3.6E+00	nc		
		1.5E-02	I			1.5E-02	r	0.1 82657-04-3	Biphenthrin (Talstar)		9.2E+02	nc	9.2E+03	nc	5.5E+01	nc	5.5E+02	nc		
		5.0E-02	I			5.0E-02	r	y 92-52-4	**1,1-Biphenyl**		3.0E+03	nc	2.3E+04	nc	1.8E+02	nc	3.0E+02	nc		
1.1E+00	I			1.1E+00	I			y 111-44-4	Bis(2-chloroethyl)ether		2.2E-01	ca	5.8E-01	ca	6.1E-03	ca	1.0E-02	ca	4.0E-04	2.0E-05
7.0E-02	x	4.0E-02	I	3.5E-02	x	4.0E-02	r	y 108-60-1	Bis(2-chloroisopropyl)ether		2.9E+00	ca	7.4E+00	ca	1.9E-01	ca	2.7E-01	ca		
2.2E+02	I			2.2E+02	I			y 542-88-1	Bis(chloromethyl)ether		1.9E-04	ca	4.3E-04	ca	3.1E-05	ca	5.2E-05	ca		
7.0E-02	x	4.0E-02	I	3.5E-02	x	4.0E-02	r	y 108-60-1	Bis(2-chloro-1-methylethyl)ether		2.9E+00	ca	7.4E+00	ca	1.9E-01	ca	2.7E-01	ca		
1.4E-02	I	2.0E-02	I	1.4E-02	r	2.0E-02	r	0.1 117-81-7	Bis(2-ethylhexyl)phthalate (DEHP)		3.5E+01	ca*	1.2E+02	ca	4.8E-01	ca	4.8E+00	ca		
		5.0E-02	I			5.0E-02	r	0.1 80-05-7	Bisphenol A		3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
		2.00E-01	I			5.7E-03	h	7440-42-8	Boron		1.6E+04	nc	1.0E+05	max	2.1E+01	nc	7.3E+03	nc		
						2.0E-04	h	7637-07-2	Boron trifluoride						7.3E-01	nc				
7.0E-01	I	4.0E-03	I	7.0E-01	r	4.0E-03	r	0.1 15541-45-4	**Bromate**		6.9E-01	ca	2.5E+00	ca	9.6E-03	ca	9.6E-02	ca		
		2.0E-02	p			2.9E-03	p	y 108-86-1	Bromobenzene		2.8E+01	nc	9.2E+01	nc	1.0E+01	nc	2.0E+01	nc		
6.2E-02	I	2.0E-02	I	6.2E-02	r	2.0E-02	r	y 75-27-4	Bromodichloromethane		8.2E-01	ca	1.8E+00	ca	1.1E-01	ca	1.8E-01	ca	6.0E-01	3.0E-02
7.9E-03	I	2.0E-02	I	3.9E-03	I	2.0E-02	r	0.1 75-25-2	Bromoform (tribromomethane)		6.2E+01	ca*	2.2E+02	ca*	1.7E+00	ca*	8.5E+00	ca*	8.0E-01	4.0E-02
		1.4E-03	I			1.4E-03	I	y 74-83-9	Bromomethane (Methyl bromide)		3.9E+00	nc	1.3E+01	nc	5.2E+00	nc	8.7E+00	nc	2.0E-01	1.0E-02
		5.0E-03	h			5.0E-03	r	0.1 2104-96-3	Bromophos		3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.0E-02	I			2.0E-02	r	0.1 1689-84-5	Bromoxynil		1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-02	I			2.0E-02	r	0.1 1689-99-2	Bromoxynil octanoate		1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
1.1E-01	r	5.7E-04	r	1.1E-01	I	5.7E-04	I	y 106-99-0	**1,3-Butadiene**		5.8E-02	ca*	1.2E-01	ca*	6.1E-02	ca*	1.0E-01	ca*		
6.0E-01	r	5.7E-03	r	6.0E-01	c	5.7E-03	c	y 106-99-0	**"CAL-Modified PRG"**		1.1E-02	ca	2.3E-02	ca	1.1E-02	ca	1.9E-02	ca		
		1.0E-01	I			2.6E-03	n	0.1 71-36-3	1-Butanol		6.1E+03	nc	6.1E+04	nc	9.5E+00	nc	3.6E+03	nc	1.7E+01	9.0E-01
		5.0E-02	I			5.0E-02	r	0.1 2008-41-5	Butylate		3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
		4.0E-02	n			4.0E-02	r	y 104-51-8	n-Butylbenzene		2.4E+02	sat	2.4E+02	sat	1.5E+02	nc	2.4E+02	nc		
		4.0E-02	n			4.0E-02	r	y 135-9-88	sec-Butylbenzene		2.2E+02	sat	2.2E+02	sat	1.5E+02	nc	2.4E+02	nc		
		4.0E-02	n			4.0E-02	r	y 98-06-6	tert-Butylbenzene		3.9E+02	sat	3.9E+02	sat	1.5E+02	nc	2.4E+02	nc		
		2.0E-01	I			2.0E-01	r	0.1 85-68-7	Butyl benzyl phthalate		1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc	9.3E+02	8.1E+02
		1.0E+00	I			1.0E+00	r	0.1 85-70-1	Butylphthalyl butylglycolate		6.1E+04	nc	1.0E+05	max	3.7E+03	nc	3.6E+04	nc		

Key: SFo,I=Cancer Slope Factor oral, Inhalation RfDo,I=Reference Dose oral, Inhalation i=IRIS p=PPRTV c=California EPA n=NCEA h=HEAST x=Withdrawn r=Route-extrapolation ca=Cancer PRG nc= Noncancer PRG ca* (where: nc PRG < 100X ca PRG) ca** (where nc PRG < 10X ca PRG) +++=Non-Standard Method Applied (See User's Guide) sat=Soil Saturation (See User's Guide) max=Ceiling limit (See User's Guide) DAF=Dilution Attenuation Factor (See User's Guide) CAS=Chemical Abstract Services

TOXICITY VALUES										CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFI 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		5.0E-04	I	6.3E+00	I				0.001	7440-43-9	Cadmium and compounds	3.7E+01	nc	4.5E+02	nc	1.1E-03	ca	1.8E+01	nc	8.0E+00	4.0E-01
		5.0E-01	I			5.0E-01	r		0.1	105-60-2	Caprolactam	3.1E+04	nc	1.0E+05	max	1.8E+03	nc	1.8E+04	nc		
8.6E-03	h	2.0E-03	i	8.6E-03	r	2.0E-03	r		0.1	2425-06-1	Captafol	5.7E+01	ca**	2.0E+02	ca**	7.8E-01	ca**	7.8E+00	ca**		
3.5E-03	h	1.3E-01	i	3.5E-03	r	1.3E-01	r		0.1	133-06-2	Captan	1.4E+02	ca*	4.9E+02	ca	1.9E+00	ca	1.9E+01	ca		
		1.0E-01	I			1.1E-01	r		0.1	63-25-2	Carbaryl	6.1E+03	nc	6.2E+04	nc	4.0E+02	nc	3.6E+03	nc		
2.0E-02	h			2.0E-02	r				0.1	86-74-8	Carbazole	2.4E+01	ca	8.6E+01	ca	3.4E-01	ca	3.4E+00	ca	6.0E-01	3.0E-02
		5.0E-03	I			5.0E-03	r		0.1	1563-66-2	Carbofuran	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc		
		1.0E-01	I			2.0E-01	I	y		75-15-0	Carbon disulfide	3.6E+02	nc	7.2E+02	sat	7.3E+02	nc	1.0E+03	nc	3.2E+01	2.0E+00
1.3E-01	I	7.0E-04	I	5.3E-02	I	7.0E-04	r	y		56-23-5	Carbon tetrachloride	2.5E-01	ca**	5.5E-01	ca*	1.3E-01	ca*	1.7E-01	ca*	7.0E-02	3.0E-03
		1.0E-02	I			1.0E-02	r		0.1	55285-14-8	Carbosulfan	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
		1.0E-01	I			1.0E-01	r		0.1	5234-68-4	Carboxin	6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc		
		1.5E-02	I			1.5E-02	r		0.1	133-90-4	Chloramben	9.2E+02	nc	9.2E+03	nc	5.5E+01	nc	5.5E+02	nc		
4.0E-01	h			4.0E-01	r				0.1	118-75-2	Chloranil	1.2E+00	ca	4.3E+00	ca	1.7E-02	ca	1.7E-01	ca		
3.5E-01	I	5.0E-04	I	3.5E-01	I	2.0E-04	I		0.04	12789-03-6	Chlordane (technical)	1.6E+00	ca*	6.5E+00	ca*	1.9E-02	ca*	1.9E-01	ca*	1.0E+01	5.0E-01
		2.0E-02	I			2.0E-02	r		0.1	90982-32-4	Chlorimuron-ethyl	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.0E-01	I			5.7E-05	n			7782-50-5	Chlorine					2.1E-01	nc				
		3.0E-02	I			5.7E-05	I			10049-04-4	Chlorine dioxide					2.1E-01	nc				
		2.0E-03	h			2.0E-03	r		0.1	79-11-8	Chloroacetic acid	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
		8.6E-06	r			8.6E-06	I	y		532-27-4	2-Chloroacetophenone	3.3E-02	nc	1.1E-01	nc	3.1E-02	nc	5.2E-02	nc		
		4.0E-03	I			4.0E-03	r		0.1	106-47-8	4-Chloroaniline	2.4E+02	nc	2.5E+03	nc	1.5E+01	nc	1.5E+02	nc	7.0E-01	3.0E-02
		2.0E-02	I			1.7E-02	n	y		108-90-7	Chlorobenzene	1.5E+02	nc	5.3E+02	nc	6.2E+01	nc	1.1E+02	nc	1.0E+00	7.0E-02
2.7E-01	h	2.0E-02	I	2.7E-01	h	2.0E-02	r		0.1	510-15-6	Chlorobenzilate	1.8E+00	ca	6.4E+00	ca	2.5E-02	ca	2.5E-01	ca		
		2.0E-01	h			2.0E-01	r		0.1	74-11-3	p-Chlorobenzoic acid	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
		2.0E-02	h			2.0E-02	r		0.1	98-56-6	4-Chlorobenzotrifluoride	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-02	h			2.0E-03	h	y		126-99-8	2-Chloro-1,3-butadiene	3.6E+00	nc	1.2E+01	nc	7.3E+00	nc	1.4E+01	nc		
		4.0E-01	h			4.0E-01	r	y		109-69-3	1-Chlorobutane	4.8E+02	sat	4.8E+02	sat	1.5E+03	nc	2.4E+03	nc		
		1.4E+01	r			1.4E+01	I	y		75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	3.4E+02	sat	3.4E+02	sat	5.2E+04	nc	8.7E+04	nc		
		1.4E+01	r			1.4E+01	I	y		75-45-6	Chlorodifluoromethane	3.4E+02	sat	3.4E+02	sat	5.1E+04	nc	8.5E+04	nc		
2.9E-03	n	4.0E-01	n	2.9E-03	r	2.9E+00	I	y		75-00-3	Chloroethane	3.0E+00	ca	6.5E+00	ca	2.3E+00	ca	4.6E+00	ca		
		1.0E-02	I	8.1E-02	I	1.4E-02	n	y		67-66-3	**Chloroform**	2.2E-01	ca	4.7E-01	ca	8.3E-02	ca	1.7E-01	ca	6.0E-01	3.0E-02
3.1E-02	c			1.9E-02	c			y			"CAL-Modified PRG"	9.4E-01	ca	2.0E+00	ca	3.5E-01	ca	5.3E-01	ca		
		2.8E-02	r			2.6E-02	I	y		74-87-3	**Chloromethane (methyl chloride)**	4.7E+01	nc	1.6E+02	nc	9.5E+01	nc	1.6E+02	nc		
5.8E-01	h			5.8E-01	r				0.1	95-69-2	4-Chloro-2-methylaniline	8.4E-01	ca	3.0E+00	ca	1.2E-02	ca	1.2E-01	ca		
4.6E-01	h			4.6E-01	r				0.1	3165-93-3	4-Chloro-2-methylaniline hydrochloride	1.1E+00	ca	3.7E+00	ca	1.5E-02	ca	1.5E-01	ca		
		8.0E-02	I			8.0E-02	r	y		91-58-7	beta-Chloronaphthalene	4.9E+03	nc	2.3E+04	nc	2.9E+02	nc	4.9E+02	nc		
9.7E-03	p	1.0E-03	p	9.7E-03	r	2.0E-05	p	y		88-73-3	o-Chloronitrobenzene	1.4E+00	nc**	4.5E+00	nc**	7.3E-02	nc**	1.5E-01	nc**		
6.7E-03	p	1.0E-03	p	6.7E-03	r	1.7E-04	p	y		100-00-5	p-Chloronitrobenzene	1.0E+01	nc**	3.7E+01	nc**	6.2E-01	nc**	1.2E+00	nc**		
		5.0E-03	I			5.0E-03	r	y		95-57-8	2-Chlorophenol	6.3E+01	nc	2.4E+02	nc	1.8E+01	nc	3.0E+01	nc	4.0E+00	2.0E-01
		2.9E-02	r			2.9E-02	h	y		75-29-6	2-Chloropropane	1.7E+02	nc	5.9E+02	nc	1.0E+02	nc	1.7E+02	nc		
1.1E-02	h	1.5E-02	I	1.1E-02	r	1.5E-02	r		0.1	1897-45-6	Chlorothalonil	4.4E+01	ca*	1.6E+02	ca*	6.1E-01	ca*	6.1E+00	ca*		
		2.0E-02	I			2.0E-02	r	y		95-49-8	o-Chlorotoluene	1.6E+02	nc	5.6E+02	nc	7.3E+01	nc	1.2E+02	nc		
		2.0E-01	I			2.0E-01	r		0.1	101-21-3	Chlorpropham	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		

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TOXICITY VALUES								CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C skin abs. soils CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		3.0E-03	i			3.0E-03	r 0.1 2921-88-2	Chlorpyrifos	1.8E+02	nc	1.8E+03	nc	1.1E+01	nc	1.1E+02	nc		
		1.0E-02	h			1.0E-02	r 0.1 5598-13-0	Chlorpyrifos-methyl	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
		5.0E-02	i			5.0E-02	r 0.1 64902-72-3	Chlorsulfuron	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
		8.0E-04	h			8.0E-04	r 0.1 60238-56-4	Chlorthiophos	4.9E+01	nc	4.9E+02	nc	2.9E+00	nc	2.9E+01	nc		
				4.2E+01	i			Total Chromium (1:6 ratio Cr VI:Cr III)+++	2.1E+02	ca	4.5E+02	ca	1.6E-04	ca			3.8E+01	2.0E+00
		1.5E+00	i				16065-83-1	Chromium III	1.0E+05	max	1.0E+05	max			5.5E+04	nc		
		3.0E-03	i	2.9E+02	i	2.2E-06	i 18540-29-9	Chromium VI+++	3.0E+01	ca**	6.4E+01	ca	2.3E-05	ca	1.1E+02	nc	3.8E+01	2.0E+00
		2.0E-02	p	9.8E+00	p	5.7E-06	p 7440-48-4	Cobalt	9.0E+02	ca**	1.9E+03	ca*	6.9E-04	ca*	7.3E+02	nc		
				2.2E+00	i			Coke Oven Emissions					3.1E-03	ca				
		4.0E-02	h				7440-50-8	Copper and compounds	3.1E+03	nc	4.1E+04	nc			1.5E+03	nc		
1.9E+00	h			1.9E+00	r		y 123-73-9	Crotonaldehyde	5.3E-03	ca	1.1E-02	ca	3.5E-03	ca	5.9E-03	ca		
		1.0E-01	i			1.1E-01	i y 98-82-8	Cumene (isopropylbenzene)	5.7E+02	nc	2.0E+03	nc	4.0E+02	nc	6.6E+02	nc		
8.4E-01	h	2.0E-03	h	8.4E-01	r	2.0E-03	r 0.1 21725-46-2	Cyanazine	5.8E-01	ca	2.1E+00	ca	8.0E-03	ca	8.0E-02	ca		
		2.0E-02	i				0.1 57-12-5	Cyanide (free)	1.2E+03	nc	1.2E+04	nc			7.3E+02	nc		
		2.0E-02	i			8.6E-04	i y 74-90-8	Cyanide (hydrogen)	1.1E+01	nc	3.5E+01	nc	3.1E+00	nc	6.2E+00	nc		
		4.0E-02	i			4.0E-02	r y 460-19-5	Cyanogen	1.3E+02	nc	4.3E+02	nc	1.5E+02	nc	2.4E+02	nc		
		9.0E-02	i			9.0E-02	r y 506-68-3	Cyanogen bromide	2.9E+02	nc	9.7E+02	nc	3.3E+02	nc	5.5E+02	nc		
		5.0E-02	i			5.0E-02	r y 506-77-4	Cyanogen chloride	1.6E+02	nc	5.4E+02	nc	1.8E+02	nc	3.0E+02	nc		
		1.7E+00	r			1.7E+00	i y 110-82-7	**Cyclohexane**	1.4E+02	sat	1.4E+02	sat	6.2E+03	nc	1.0E+04	nc		
		5.0E+00	i			5.0E+00	r 0.1 108-94-1	Cyclohexanone	1.0E+05	max	1.0E+05	max	1.8E+04	nc	1.8E+05	nc		
		2.0E-01	i			2.0E-01	r 0.1 108-91-8	Cyclohexylamine	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
		5.0E-03	i			5.0E-03	r 0.1 68085-85-8	Cyhalothrin/Karate	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc		
		1.0E-02	i			1.0E-02	r 0.1 52315-07-8	Cypermethrin	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
		7.5E-03	i			7.5E-03	r 0.1 66215-27-8	Cyromazine	4.6E+02	nc	4.6E+03	nc	2.7E+01	nc	2.7E+02	nc		
		1.0E-02	i			1.0E-02	r 0.1 1861-32-1	Dacthal	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
		3.0E-02	i			3.0E-02	r 0.1 75-99-0	Dalapon	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc		
		2.5E-02	i			2.5E-02	r 0.1 39515-41-8	Danitol	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc		
2.4E-01	i			2.4E-01	r		0.03 72-54-8	DDD	2.4E+00	ca	1.0E+01	ca	2.8E-02	ca	2.8E-01	ca	1.6E+01	8.0E-01
3.4E-01	i			3.4E-01	r		0.03 72-55-9	DDE	1.7E+00	ca	7.0E+00	ca	2.0E-02	ca	2.0E-01	ca	5.4E+01	3.0E+00
3.4E-01	i	5.0E-04	i	3.4E-01	i	5.0E-04	r 0.03 50-29-3	DDT	1.7E+00	ca*	7.0E+00	ca*	2.0E-02	ca*	2.0E-01	ca*	3.2E+01	2.0E+00
		1.0E-02	i			1.0E-02	r 0.1 1163-19-5	Decabromodiphenyl ether	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
		4.0E-05	i			4.0E-05	r 0.1 8065-48-3	Demeton	2.4E+00	nc	2.5E+01	nc	1.5E-01	nc	1.5E+00	nc		
6.1E-02	h			6.1E-02	r		0.1 2303-16-4	Diallate	8.0E+00	ca	2.8E+01	ca	1.1E-01	ca	1.1E+00	ca		
		9.0E-04	h			9.0E-04	r 0.1 333-41-5	Diazinon	5.5E+01	nc	5.5E+02	nc	3.3E+00	nc	3.3E+01	nc		
		2.0E-03	n			2.0E-03	r y 132-64-9	**Dibenzofuran**	1.5E+02	nc	1.6E+03	nc	7.3E+00	nc	1.2E+01	nc		
		1.0E-02	i			1.0E-02	r 0.1 106-37-6	1,4-Dibromobenzene	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
8.4E-02	i	2.0E-02	i	8.4E-02	r	2.0E-02	r y 124-48-1	Dibromochloromethane	1.1E+00	ca	2.6E+00	ca	8.0E-02	ca	1.3E-01	ca	4.0E-01	2.0E-02
1.4E+00	h	5.7E-05	r	2.4E-03	x	5.7E-05	i y 96-12-8	**1,2-Dibromo-3-chloropropane (DBCP)**	4.6E-01	ca**	2.0E+00	ca**	2.1E-01	nc	4.8E-02	ca**		
7.0E+00	c			7.0E+00	c		y 96-12-8	**"CAL-Modified PRG"**	3.0E-02	ca	7.6E-02	ca	9.6E-04	ca	1.6E-03	ca		
2.0E+00	i	9.0E-03	i	2.0E+00	i	2.6E-03	i y 106-93-4	**1,2-Dibromoethane (EDB)**	3.2E-02	ca	7.3E-02	ca	3.4E-03	ca	5.6E-03	ca		
		1.0E-01	i			1.0E-01	r 0.1 84-74-2	Dibutyl phthalate	6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc	2.3E+03	2.7E+02
		3.0E-02	i			3.0E-02	r 0.1 1918-00-9	Dicamba	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc		

Key : SFo,I=Cancer Slope Factor oral, inhalation RfDo,I=Reference Dose oral, inhalation i=IRIS p=PPRTV c=California EPA n=NCEA h=HEAST x=Withdrawn r=Route-extrapolation ca=Cancer PRG nc=Noncancer PRG ca* (where: nc PRG < 100X ca PRG) ca** (where nc PRG < 10X ca PRG) +++=Non-Standard Method Applied (See User's Guide) sat=Soil Saturation (See User's Guide) max=Ceiling limit (See User's Guide) DAF=Dilution Attenuation Factor (See User's Guide) CAS=Chemical Abstract Services

TOXICITY VALUES									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		9.0E-02	i			5.7E-02	h y		95-50-1	1,2-Dichlorobenzene	6.0E+02	sat	6.0E+02	sat	2.1E+02	nc	3.7E+02	nc	1.7E+01	9.0E-01
		3.0E-02	n			3.0E-02	r y		541-73-1	1,3-Dichlorobenzene	5.3E+02	nc	6.0E+02	sat	1.1E+02	nc	1.8E+02	nc		
2.4E-02	h	3.0E-02	n	2.2E-02	n	2.3E-01	i y		106-46-7	1,4-Dichlorobenzene	3.4E+00	ca	7.9E+00	ca	3.1E-01	ca	5.0E-01	ca	2.0E+00	1.0E-01
4.5E-01	i			4.5E-01	r			0.1	91-94-1	3,3-Dichlorobenzidine	1.1E+00	ca	3.8E+00	ca	1.5E-02	ca	1.5E-01	ca	7.0E-03	3.0E-04
		3.0E-02	n			3.0E-02	r	0.1	90-98-2	4,4'-Dichlorobenzophenone	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc		
9.3E+00	r			9.3E+00	h		y		764-41-0	1,4-Dichloro-2-butene	7.9E-03	ca	1.8E-02	ca	7.2E-04	ca	1.2E-03	ca		
		2.0E-01	i			5.7E-02	h y		75-71-8	Dichlorodifluoromethane	9.4E+01	nc	3.1E+02	nc	2.1E+02	nc	3.9E+02	nc		
		1.0E-01	h			1.4E-01	h y		75-34-3	1,1-Dichloroethane	5.1E+02	nc	1.7E+03	nc	5.2E+02	nc	8.1E+02	nc	2.3E+01	1.0E+00
5.7E-03	c			5.7E-03	c		y			"CAL-Modified PRG"	2.8E+00	ca	6.0E+00	ca	1.2E+00	ca	2.0E+00	ca		
9.1E-02	i	2.0E-02	n	9.1E-02	i	1.4E-03	n y		107-06-2	1,2-Dichloroethane (EDC)	2.8E-01	ca*	6.0E-01	ca*	7.4E-02	ca*	1.2E-01	ca*	2.0E-02	1.0E-03
		5.0E-02	i			5.7E-02	i y		75-35-4	1,1-Dichloroethylene	1.2E+02	nc	4.1E+02	nc	2.1E+02	nc	3.4E+02	nc	6.0E-02	3.0E-03
		1.0E-02	p			1.0E-02	r y		156-59-2	1,2-Dichloroethylene (cis)	4.3E+01	nc	1.5E+02	nc	3.7E+01	nc	6.1E+01	nc	4.0E-01	2.0E-02
		2.0E-02	i			2.0E-02	r y		156-60-5	1,2-Dichloroethylene (trans)	6.9E+01	nc	2.3E+02	nc	7.3E+01	nc	1.2E+02	nc	7.0E-01	3.0E-02
		3.0E-03	i			3.0E-03	r	0.1	120-83-2	2,4-Dichlorophenol	1.8E+02	nc	1.8E+03	nc	1.1E+01	nc	1.1E+02	nc	1.0E+00	5.0E-02
		8.0E-03	i			8.0E-03	r	0.1	94-82-6	4-(2,4-Dichlorophenoxy)butyric Acid (2,4-DB)	4.9E+02	nc	4.9E+03	nc	2.9E+01	nc	2.9E+02	nc		
		1.0E-02	i			1.0E-02	r	0.05	94-75-7	2,4-Dichlorophenoxyacetic Acid (2,4-D)	6.9E+02	nc	7.7E+03	nc	3.7E+01	nc	3.6E+02	nc		
6.8E-02	h	1.1E-03	r	6.8E-02	r	1.1E-03	i y		78-87-5	1,2-Dichloropropane	3.4E-01	ca*	7.4E-01	ca*	9.9E-02	ca*	1.6E-01	ca*	3.0E-02	1.0E-03
		2.0E-02	p			2.0E-02	r y		142-28-9	1,3-Dichloropropane	1.0E+02	nc	3.6E+02	nc	7.3E+01	nc	1.2E+02	nc		
1.0E-01	i	3.0E-02	i	1.4E-02	i	5.7E-03	i y		542-75-6	1,3-Dichloropropene	7.8E-01	ca	1.8E+00	ca	4.8E-01	ca	4.0E-01	ca	4.0E-03	2.0E-04
		3.0E-03	i			3.0E-03	r	0.1	616-23-9	2,3-Dichloropropanol	1.8E+02	nc	1.8E+03	nc	1.1E+01	nc	1.1E+02	nc		
2.9E-01	i	5.0E-04	i	2.9E-01	r	1.4E-04	i	0.1	62-73-7	Dichlorvos	1.7E+00	ca*	5.9E+00	ca*	2.3E-02	ca*	2.3E-01	ca*		
4.4E-01	x			4.4E-01	r			0.1	115-32-2	Dicofol	1.1E+00	ca	3.9E+00	ca	1.5E-02	ca	1.5E-01	ca		
		3.0E-02	h			5.7E-05	x y		77-73-6	Dicyclopentadiene	5.4E-01	nc	1.8E+00	nc	2.1E-01	nc	4.2E-01	nc		
1.6E+01	i	5.0E-05	i	1.6E+01	i	5.0E-05	r	0.1	60-57-1	Dieldrin	3.0E-02	ca	1.1E-01	ca	4.2E-04	ca	4.2E-03	ca	4.0E-03	2.0E-04
		1.0E-02	p			5.7E-03	p	0.1	112-34-5	Diethylene glycol, monobutyl ether	6.1E+02	nc	6.2E+03	nc	2.1E+01	nc	3.6E+02	nc		
		6.0E-02	p			8.8E-04	p	0.1	111-90-0	Diethylene glycol, monoethyl ether	3.7E+03	nc	3.7E+04	nc	3.1E+00	nc	2.2E+03	nc		
		4.0E-04	p			4.0E-04	r	0.1	617-84-5	Diethylformamide	2.4E+01	nc	2.5E+02	nc	1.5E+00	nc	1.5E+01	nc		
1.2E-03	i	6.0E-01	i	1.2E-03	r	6.0E-01	r	0.1	103-23-1	Di(2-ethylhexyl)adipate	4.1E+02	ca	1.4E+03	ca	5.6E+00	ca	5.6E+01	ca		
		8.0E-01	i			8.0E-01	r	0.1	84-66-2	Diethyl phthalate	4.9E+04	nc	1.0E+05	max	2.9E+03	nc	2.9E+04	nc		
4.7E+03	h			4.7E+03	r			0.1	56-53-1	Diethylstilbestrol	1.0E-04	ca	3.7E-04	ca	1.4E-06	ca	1.4E-05	ca		
		8.0E-02	i			8.0E-02	r	0.1	43222-48-6	Difenzoquat (Avenge)	4.9E+03	nc	4.9E+04	nc	2.9E+02	nc	2.9E+03	nc		
		2.0E-02	i			2.0E-02	r	0.1	35367-38-5	Diflubenzuron	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.1E+01	r			1.1E+01	i y		75-37-6	1,1-Difluoroethane					4.2E+04	nc	6.9E+04	nc		
		2.0E-02	n			2.0E-02	r	0.1	28553-12-0	Diisononyl phthalate	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
						1.1E-01	p		108-20-3	Diisopropyl ether					4.0E+02	nc				
		8.0E-02	i			8.0E-02	r	0.1	1445-75-6	Diisopropyl methylphosphonate	4.9E+03	nc	4.9E+04	nc	2.9E+02	nc	2.9E+03	nc		
		2.0E-02	i			2.0E-02	r	0.1	55290-64-7	Dimethipin	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-04	i			2.0E-04	r	0.1	60-51-5	Dimethoate	1.2E+01	nc	1.2E+02	nc	7.3E-01	nc	7.3E+00	nc		
1.4E-02	h			1.4E-02	r			0.1	119-90-4	3,3'-Dimethoxybenzidine	3.5E+01	ca	1.2E+02	ca	4.8E-01	ca	4.8E+00	ca		
		5.7E-06	r			5.7E-06	x	y	124-40-3	Dimethylamine	6.7E-02	nc	2.5E-01	nc	2.1E-02	nc	3.5E-02	nc		
		2.0E-03	i			2.0E-03	r	0.1	121-69-7	N-N-Dimethylaniline	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
7.5E-01	h			7.5E-01	r			0.1	95-68-1	2,4-Dimethylaniline	6.5E-01	ca	2.3E+00	ca	9.0E-03	ca	9.0E-02	ca		

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ca** (where nc PRG < 10X ca PRG) +++=Non-Standard Method Applied (See User's Guide) sat=Soil Saturation (See User's Guide) max=Ceiling limit (See User's Guide) DAF=Dilution Attenuation Factor (See User's Guide) CAS=Chemical Abstract Services

TOXICITY VALUES							CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C	skin abs. soils CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
5.8E-01	h			5.8E-01	r			0.1 21436-96-4	2,4-Dimethylaniline hydrochloride	8.4E-01	ca	3.0E+00	ca	1.2E-02	ca	1.2E-01	ca		
2.3E+00	p			2.3E+00	r			0.1 119-93-7	**3,3'-Dimethylbenzidine**	2.1E-01	ca	7.5E-01	ca	2.9E-03	ca	2.9E-02	ca		
		1.0E-01	h			8.6E-03	i	0.1 68-12-2	N,N-Dimethylformamide	6.1E+03	nc	6.2E+04	nc	3.1E+01	nc	3.6E+03	nc		
		1.0E-03	n			1.0E-03	r	0.1 122-09-8	Dimethylphenethylamine	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
		2.0E-02	i			2.0E-02	r	0.1 105-67-9	2,4-Dimethylphenol	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc	9.0E+00	4.0E-01
		6.0E-04	i			6.0E-04	r	0.1 576-26-1	2,6-Dimethylphenol	3.7E+01	nc	3.7E+02	nc	2.2E+00	nc	2.2E+01	nc		
		1.0E-03	i			1.0E-03	r	0.1 95-65-8	3,4-Dimethylphenol	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
		1.0E+01	h			1.0E+01	r	0.1 131-11-3	Dimethyl phthalate	1.0E+05	max	1.0E+05	max	3.7E+04	nc	3.6E+05	nc		
		1.0E-01	i			1.0E-01	r	0.1 120-61-6	Dimethyl terephthalate	6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc		
		1.0E-04	p			1.0E-04	r	0.1 534-52-1	**4,6-Dinitro-o-cresol**	6.1E+00	nc	6.2E+01	nc	3.7E-01	nc	3.6E+00	nc		
		2.0E-03	i			2.0E-03	r	0.1 131-89-5	4,6-Dinitro-o-cyclohexyl phenol	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
		1.0E-04	p			1.0E-04	r	0.1 528-29-0	1,2-Dinitrobenzene	6.1E+00	nc	6.2E+01	nc	3.7E-01	nc	3.6E+00	nc		
		1.0E-04	i			1.0E-04	r	0.1 99-65-0	1,3-Dinitrobenzene	6.1E+00	nc	6.2E+01	nc	3.7E-01	nc	3.6E+00	nc		
		1.0E-04	p			1.0E-04	r	0.1 100-25-4	1,4-Dinitrobenzene	6.1E+00	nc	6.2E+01	nc	3.7E-01	nc	3.6E+00	nc		
		2.0E-03	i			2.0E-03	r	0.1 51-28-5	2,4-Dinitrophenol	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc	3.0E-01	1.0E-02
6.8E-01	i			6.8E-01	r			0.1 25321-14-6	Dinitrotoluene mixture	7.2E-01	ca	2.5E+00	ca	9.9E-03	ca	9.9E-02	ca	8.0E-04	4.0E-05
		2.0E-03	i			2.0E-03	r	0.1 121-14-2	2,4-Dinitrotoluene (also see Dinitrotoluene mixture)	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc	8.0E-04	4.0E-05
		1.0E-03	h			1.0E-03	r	0.1 606-20-2	2,6-Dinitrotoluene (also see Dinitrotoluene mixture)	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc	7.0E-04	3.0E-05
		1.0E-03	i			1.0E-03	r	0.1 88-85-7	Dinoseb	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
		4.0E-02	p			4.0E-02	r	0.1 117-84-0	di-n-Octyl phthalate	2.4E+03	nc	2.5E+04	nc	1.5E+02	nc	1.5E+03	nc	1.0E+04	1.0E+04
1.1E-02	i			1.1E-02	r			0.1 123-91-1	1,4-Dioxane	4.4E+01	ca	1.6E+02	ca	6.1E-01	ca	6.1E+00	ca		
1.5E+05	h			1.5E+05	h			0.03 1746-01-6	Dioxin (2,3,7,8-TCDD)+++	3.9E-06	ca	1.6E-05	ca	4.5E-08	ca	4.5E-07	ca		
		3.0E-02	i			3.0E-02	r	0.1 957-51-7	Diphenamid	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc		
		2.5E-02	i			2.5E-02	r	0.1 122-39-4	Diphenylamine	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc		
		3.0E-04	p			3.0E-04	r	0.1 74-31-7	N,N-Diphenyl-1,4 benzenediamine (DPPD)	1.8E+01	nc	1.8E+02	nc	1.1E+00	nc	1.1E+01	nc		
8.0E-01	i			8.0E-01	i			0.1 122-66-7	1,2-Diphenylhydrazine	6.1E-01	ca	2.2E+00	ca	8.4E-03	ca	8.4E-02	ca		
		3.0E-03	p			3.0E-03	r	0.1 127-63-9	Diphenyl sulfone	1.8E+02	nc	1.8E+03	nc	1.1E+01	nc	1.1E+02	nc		
		2.2E-03	i			2.2E-03	r	0.1 85-00-7	Diquat	1.3E+02	nc	1.4E+03	nc	8.0E+00	nc	8.0E+01	nc		
8.6E+00	h			8.6E+00	r			0.1 1937-37-7	Direct black 38	5.7E-02	ca	2.0E-01	ca	7.8E-04	ca	7.8E-03	ca		
8.1E+00	h			8.1E+00	r			0.1 2602-46-2	Direct blue 6	6.0E-02	ca	2.1E-01	ca	8.3E-04	ca	8.3E-03	ca		
9.3E+00	h			9.3E+00	r			0.1 16071-86-6	Direct brown 95	5.2E-02	ca	1.9E-01	ca	7.2E-04	ca	7.2E-03	ca		
		4.0E-05	i			4.0E-05	r	0.1 298-04-4	Disulfoton	2.4E+00	nc	2.5E+01	nc	1.5E-01	nc	1.5E+00	nc		
		1.0E-02	i			1.0E-02	r	0.1 505-29-3	1,4-Dithiane	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
		2.0E-03	i			2.0E-03	r	0.1 330-54-1	Diuron	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
		4.0E-03	i			4.0E-03	r	0.1 2439-10-3	Dodine	2.4E+02	nc	2.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
		1.0E-01	n					7429-91-6	Dysprosium	7.8E+03	nc	1.0E+05	max			3.6E+03	nc		
		6.0E-03	i			6.0E-03	r	0.1 115-29-7	Endosulfan	3.7E+02	nc	3.7E+03	nc	2.2E+01	nc	2.2E+02	nc	1.8E+01	9.0E-01
		2.0E-02	i			2.0E-02	r	0.1 145-73-3	Endothall	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		3.0E-04	i			3.0E-04	r	0.1 72-20-8	Endrin	1.8E+01	nc	1.8E+02	nc	1.1E+00	nc	1.1E+01	nc	1.0E+00	5.0E-02
9.9E-03	i	2.0E-03	h	4.2E-03	h	2.9E-04	i	y	106-89-8 Epichlorohydrin	7.6E+00	nc	2.6E+01	nc	1.0E+00	nc	2.0E+00	nc		

Key : SFo,I=Cancer Slope Factor oral, Inhalation RfDo,I=Reference Dose oral, Inhalation i=IRIS p=PPRTV c=California EPA n=NCEA h=HEAST x=Withdrawn r=Route-extrapolation ca=Cancer PRG nc= Noncancer PRG ca* (where: nc PRG < 100X ca PRG) ca** (where nc PRG < 10X ca PRG) +++=Non-Standard Method Applied (See User's Guide) sat=Soil Saturation (See User's Guide) max=Ceiling limit (See User's Guide) DAF=Dilution Attenuation Factor (See User's Guide) CAS=Chemical Abstract Services

TOXICITY VALUES								CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
8.00E-02	r			8.00E-02	c		y		"CAL-Modified PRG"	1.3E+00	nc	2.9E+00	nc	8.4E-02	nc	1.4E-01	nc		
		5.7E-03	r			5.7E-03	i	0.1 106-88-7	1,2-Epoxybutane	3.5E+02	nc	3.5E+03	nc	2.1E+01	nc	2.1E+02	nc		
		2.5E-02	i			2.5E-02	r	0.1 759-94-4	EPTC (S-Ethyl dipropylthiocarbamate)	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc		
		5.0E-03	i			5.0E-03	r	0.1 16672-87-0	Ethephon (2-chloroethyl phosphonic acid)	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc		
		5.0E-04	i			5.0E-04	r	0.1 563-12-2	Ethion	3.1E+01	nc	3.1E+02	nc	1.8E+00	nc	1.8E+01	nc		
		4.0E-01	h			5.7E-02	i	0.1 110-80-5	2-Ethoxyethanol	2.4E+04	nc	1.0E+05	max	2.1E+02	nc	1.5E+04	nc		
		3.0E-01	h			3.0E-01	r	0.1 111-15-9	2-Ethoxyethanol acetate	1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		
		9.0E-01	i			9.0E-01	r	y 141-78-6	Ethyl acetate	1.9E+04	nc	3.7E+04	sat	3.3E+03	nc	5.5E+03	nc		
4.8E-02	h			4.8E-02	r			y 140-88-5	Ethyl acrylate	2.1E-01	ca	4.5E-01	ca	1.4E-01	ca	2.3E-01	ca		
		1.0E-01	i			2.9E-01	i	y 100-41-4	**Ethylbenzene**	4.0E+02	sat	4.0E+02	sat	1.1E+03	nc	1.3E+03	nc	1.3E+01	7.0E-01
2.9E-03	n	4.0E-01	n	2.9E-03	r	2.9E+00	i	y 75-00-3	Ethyl chloride	3.0E+00	ca	6.5E+00	ca	2.3E+00	ca	4.6E+00	ca		
		3.0E-01	h			3.0E-01	r	0.1 109-78-4	Ethylene cyanohydrin	1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		
		9.0E-02	p			9.0E-02	r	0.1 107-15-3	**Ethylene diamine**	5.5E+03	nc	5.5E+04	nc	3.3E+02	nc	3.3E+03	nc		
		2.0E+00	i			2.0E+00	r	0.1 107-21-1	Ethylene glycol	1.0E+05	max	1.0E+05	max	7.3E+03	nc	7.3E+04	nc		
		5.0E-01	i			3.7E+00	i	0.1 111-76-2	Ethylene glycol, monobutyl ether	3.1E+04	nc	1.0E+05	max	1.4E+04	nc	1.8E+04	nc		
1.0E+00	h			3.5E-01	h			y 75-21-8	Ethylene oxide	1.4E-01	ca	3.4E-01	ca	1.9E-02	ca	2.4E-02	ca		
1.1E-01	h	8.0E-05	i	1.1E-01	r	8.0E-05	r	0.1 96-45-7	Ethylene thiourea (ETU)	4.4E+00	ca**	1.6E+01	ca**	6.1E-02	ca**	6.1E-01	ca**		
		2.0E-01	i			2.0E-01	r	y 60-29-7	Ethyl ether	1.8E+03	sat	1.8E+03	sat	7.3E+02	nc	1.2E+03	nc		
		9.0E-02	h			9.0E-02	r	y 97-63-2	Ethyl methacrylate	1.4E+02	sat	1.4E+02	sat	3.3E+02	nc	5.5E+02	nc		
		1.0E-05	i			1.0E-05	r	0.1 2104-64-5	Ethyl p-nitrophenyl phenylphosphorothioate	6.1E-01	nc	6.2E+00	nc	3.7E-02	nc	3.6E-01	nc		
		3.0E+00	i			3.0E+00	r	0.1 84-72-0	Ethylphthalyl ethyl glycolate	1.0E+05	max	1.0E+05	max	1.1E+04	nc	1.1E+05	nc		
		8.0E-03	i			8.0E-03	r	0.1 101200-48-0	Express	4.9E+02	nc	4.9E+03	nc	2.9E+01	nc	2.9E+02	nc		
		2.5E-04	i			2.5E-04	r	0.1 22224-92-6	Fenamiphos	1.5E+01	nc	1.5E+02	nc	9.1E-01	nc	9.1E+00	nc		
		1.3E-02	i			1.3E-02	r	0.1 2164-17-2	Fluometuron	7.9E+02	nc	8.0E+03	nc	4.7E+01	nc	4.7E+02	nc		
		6.0E-02	i					0.1 16984-48-8	Fluorine (soluble fluoride)	3.7E+03	nc	3.7E+04	nc			2.2E+03	nc		
		8.0E-02	i			8.0E-02	r	0.1 59756-60-4	Fluoridone	4.9E+03	nc	4.9E+04	nc	2.9E+02	nc	2.9E+03	nc		
		2.0E-02	i			2.0E-02	r	0.1 56425-91-3	Flurprimidol	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		6.0E-02	i			6.0E-02	r	0.1 66332-96-5	Flutolanil	3.7E+03	nc	3.7E+04	nc	2.2E+02	nc	2.2E+03	nc		
		1.0E-02	i			1.0E-02	r	0.1 69409-94-5	Fluvalinate	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
3.5E-03	i	1.0E-01	i	3.5E-03	r	1.0E-01	r	0.1 133-07-3	Folpet	1.4E+02	ca*	4.9E+02	ca	1.9E+00	ca	1.9E+01	ca		
1.9E-01	i			1.9E-01	r			0.1 72178-02-0	Fomesafen	2.6E+00	ca	9.1E+00	ca	3.5E-02	ca	3.5E-01	ca		
		2.0E-03	i			2.0E-03	r	0.1 944-22-9	Fonofos	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
		1.5E-01	i	4.6E-02	i			0.1 50-00-0	Formaldehyde	9.2E+03	nc	1.0E+05	nc	1.5E-01	ca	5.5E+03	nc		
		2.0E+00	h			8.6E-04	p	0.1 64-18-6	**Formic Acid**	1.0E+05	max	1.0E+05	max	3.1E+00	nc	7.3E+04	nc		
		3.0E+00	i			3.0E+00	r	0.1 39148-24-8	Fosetyl-al	1.0E+05	max	1.0E+05	max	1.1E+04	nc	1.1E+05	nc		
		3.0E+01	i			8.6E+00	h	y 76-13-1	Freon 113	5.6E+03	sat	5.6E+03	sat	3.1E+04	nc	5.9E+04	nc		
		1.0E-03	i			1.0E-03	r	y 110-00-9	Furan	2.5E+00	nc	8.5E+00	nc	3.7E+00	nc	6.1E+00	nc		
3.8E+00	h			3.8E+00	r			0.1 67-45-8	Furazolidone	1.3E-01	ca	4.5E-01	ca	1.8E-03	ca	1.8E-02	ca		
		3.0E-03	i			1.4E-02	h	0.1 98-01-1	Furfural	1.8E+02	nc	1.8E+03	nc	5.2E+01	nc	1.1E+02	nc		
5.0E+01	h			5.0E+01	r			0.1 531-82-8	Furium	9.7E-03	ca	3.4E-02	ca	1.3E-04	ca	1.3E-03	ca		
3.0E-02	i			3.0E-02	r			0.1 60568-05-0	Furmecyclox	1.6E+01	ca	5.7E+01	ca	2.2E-01	ca	2.2E+00	ca		
		4.0E-04	i			4.0E-04	r	0.1 77182-82-2	Glufosinate-ammonium	2.4E+01	nc	2.5E+02	nc	1.5E+00	nc	1.5E+01	nc		

Key : SFo,i=Cancer Slope Factor oral, inhalation RfDo,i=Reference Dose oral, inhalation i=IRIS p=PPRTV c=California EPA n=NCEA h=HEAST x=Withdrawn r=Route-extrapolation ca=Cancer PRG nc= Noncancer PRG ca* (where: nc PRG < 100X ca PRG)
ca** (where nc PRG < 10X ca PRG) +++=Non-Standard Method Applied (See User's Guide) sat=Soil Saturation (See User's Guide) max=Ceiling limit (See User's Guide) DAF=Dilution Attenuation Factor (See User's Guide) CAS=Chemical Abstract Services

TOXICITY VALUES								CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C / skin abs. soils / CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		4.0E-04	i			2.9E-04	h 0.1 765-34-4	Glycidaldehyde	2.4E+01	nc	2.5E+02	nc	1.0E+00	nc	1.5E+01	nc		
		1.0E-01	i			1.0E-01	r 0.1 1071-83-6	Glyphosate	6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc		
		5.0E-05	i			5.0E-05	r 0.1 69806-40-2	Haloxyfop-methyl	3.1E+00	nc	3.1E+01	nc	1.8E-01	nc	1.8E+00	nc		
		1.3E-02	i			1.3E-02	r 0.1 79277-27-3	Harmony	7.9E+02	nc	8.0E+03	nc	4.7E+01	nc	4.7E+02	nc		
4.5E+00	i	5.0E-04	i	4.6E+00	i	5.0E-04	r 0.1 76-44-8	Heptachlor	1.1E-01	ca	3.8E-01	ca	1.5E-03	ca	1.5E-02	ca	2.3E+01	1.0E+00
9.1E+00	i	1.3E-05	i	9.1E+00	i	1.3E-05	r 0.1 1024-57-3	Heptachlor epoxide	5.3E-02	ca*	1.9E-01	ca*	7.4E-04	ca*	7.4E-03	ca*	7.0E-01	3.0E-02
		2.0E-03	i			2.0E-03	r 0.1 87-82-1	Hexabromobenzene	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
1.6E+00	i	8.0E-04	i	1.6E+00	i	8.0E-04	r 0.1 118-74-1	Hexachlorobenzene	3.0E-01	ca	1.1E+00	ca	4.2E-03	ca	4.2E-02	ca	2.0E+00	1.0E-01
7.8E-02	i	3.0E-04	n	7.8E-02	i	3.0E-04	r 0.1 87-68-3	Hexachlorobutadiene	6.2E+00	ca**	2.2E+01	ca**	8.6E-02	ca*	8.6E-01	ca*	2.0E+00	1.0E-01
6.3E+00	i	5.0E-04	n	6.3E+00	i	5.0E-04	r 0.04 319-84-6	HCH (alpha)	9.0E-02	ca	3.6E-01	ca	1.1E-03	ca	1.1E-02	ca	5.0E-04	3.0E-05
1.8E+00	i	2.0E-04	n	1.8E+00	i	2.0E-04	r 0.04 319-85-7	HCH (beta)	3.2E-01	ca	1.3E+00	ca	3.7E-03	ca	3.7E-02	ca	3.0E-03	1.0E-04
1.3E+00	h	3.0E-04	i	1.3E+00	r	3.0E-04	r 0.04 58-89-9	HCH (gamma) Lindane	4.4E-01	ca*	1.7E+00	ca	5.2E-03	ca	5.2E-02	ca	9.0E-03	5.0E-04
1.8E+00	i			1.8E+00	i		0.04 608-73-1	HCH-technical	3.2E-01	ca	1.3E+00	ca	3.8E-03	ca	3.7E-02	ca	3.0E-03	1.0E-04
		6.0E-03	i			5.7E-05	i 0.1 77-47-4	Hexachlorocyclopentadiene	3.7E+02	nc	3.7E+03	nc	2.1E-01	nc	2.2E+02	nc	4.0E+02	2.0E+01
1.4E-02	i	1.0E-03	i	1.4E-02	i	1.0E-03	r 0.1 67-72-1	Hexachloroethane	3.5E+01	ca**	1.2E+02	ca**	4.8E-01	ca**	4.8E+00	ca**	5.0E-01	2.0E-02
		3.0E-04	i			3.0E-04	r 0.1 70-30-4	Hexachlorophene	1.8E+01	nc	1.8E+02	nc	1.1E+00	nc	1.1E+01	nc		
1.1E-01	i	3.0E-03	i	1.1E-01	r	3.0E-03	r 0.1 121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	4.4E+00	ca*	1.6E+01	ca	6.1E-02	ca	6.1E-01	ca		
		2.9E-06	r			2.9E-06	i 0.1 822-06-0	1,6-Hexamethylene diisocyanate	1.7E-01	nc	1.8E+00	nc	1.0E-02	nc	1.0E-01	nc		
		1.1E+01	p			5.7E-02	i y 110-54-3	**n-Hexane**	1.1E+02	sat	1.1E+02	sat	2.1E+02	nc	4.2E+02	nc		
		3.3E-02	i			3.3E-02	r 0.1 51235-04-2	Hexazinone	2.0E+03	nc	2.0E+04	nc	1.2E+02	nc	1.2E+03	nc		
		5.0E-02	i			5.0E-02	r 0.1 2691-41-0	HMX	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
3.0E+00	i			1.7E+01	i		0.1 302-01-2	Hydrazine, hydrazine sulfate	1.6E-01	ca	5.7E-01	ca	3.9E-04	ca	2.2E-02	ca		
3.0E+00	n			1.7E+01	n		0.1 60-34-4	Hydrazine, monomethyl	1.6E-01	ca	5.7E-01	ca	4.0E-04	ca	2.2E-02	ca		
3.0E+00	n			1.7E+01	n		0.1 57-14-7	Hydrazine, dimethyl	1.6E-01	ca	5.7E-01	ca	4.0E-04	ca	2.2E-02	ca		
						5.7E-03	i 7647-01-0	Hydrogen chloride					2.1E+01	nc				
		2.0E-02	i			8.6E-04	i y 74-90-8	Hydrogen cyanide	1.1E+01	nc	3.5E+01	nc	3.1E+00	nc	6.2E+00	nc		
		3.0E-03	i			2.9E-04	i 7783-06-4	Hydrogen sulfide					1.0E+00	nc	1.1E+02	nc		
5.6E-02	p	4.0E-02	p	5.6E-02	r	4.0E-02	r 0.1 123-31-9	**p-Hydroquinone**	8.7E+00	ca	3.1E+01	ca	1.2E-01	ca	1.2E+00	ca		
		1.3E-02	i			1.3E-02	r 0.1 35554-44-0	Imazalil	7.9E+02	nc	8.0E+03	nc	4.7E+01	nc	4.7E+02	nc		
		2.5E-01	i			2.5E-01	r 0.1 81335-37-7	Imazaquin	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		4.0E-02	i			4.0E-02	r 0.1 36734-19-7	Iprodione	2.4E+03	nc	2.5E+04	nc	1.5E+02	nc	1.5E+03	nc		
		3.0E-01	n				7439-89-6	Iron	2.3E+04	nc	1.0E+05	max			1.1E+04	nc		
		3.0E-01	i			3.0E-01	r y 78-83-1	Isobutanol	1.3E+04	nc	4.0E+04	sat	1.1E+03	nc	1.8E+03	nc		
9.5E-04	i	2.0E-01	i	9.5E-04	r	2.0E-01	r 0.1 78-59-1	Isophorone	5.1E+02	ca*	5.1E+02	ca*	7.1E+00	ca	7.1E+01	ca	5.0E-01	3.0E-02
		1.5E-02	i			1.5E-02	r 0.1 33820-53-0	Isopropalin	9.2E+02	nc	9.2E+03	nc	5.5E+01	nc	5.5E+02	nc		
		1.0E-01	i			1.1E-01	r 0.1 1832-54-8	Isopropyl methyl phosphonic acid	6.1E+03	nc	6.2E+04	nc	4.0E+02	nc	3.6E+03	nc		
		5.0E-02	i			5.0E-02	r 0.1 82558-50-7	Isoxaben	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
8.0E+00	p	2.0E-04	p	8.0E+00	r	2.0E-04	r 0.1 143-50-0	Kepone	6.1E-02	ca	2.2E-01	ca	8.4E-04	ca	8.4E-03	ca		
		2.0E-03	i			2.0E-03	r 0.1 77501-63-4	Lactofen	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
www.epa.gov/superfund/programs/lead/eubk.htm							7439-92-1	**Lead+++**	4.0E+02	nc	8.0E+02	nc						
www.dtsc.ca.gov/ScienceTechnology/leadspred.html								"CAL-Modified PRG"+++	1.5E+02	nc								
		1.0E-07	i				0.1 75-00-3	Lead (tetraethyl)	6.1E-03	nc	6.2E-02	nc			3.6E-03	nc		

Key : SFo,i=Cancer Slope Factor oral, inhalation RfDo,i=Reference Dose oral, inhalation I=IRIS p=PPRTV c=California EPA n=NCEA h=HEAST x=Withdrawn r=Route-extrapolation ca=Cancer PRG nc= Noncancer PRG ca* (where: nc PRG < 100X ca PRG) ca** (where nc PRG < 10X ca PRG) +++=Non-Standard Method Applied (See User's Guide) sat=Soil Saturation (See User's Guide) max=Ceiling limit (See User's Guide) DAF=Dilution Attenuation Factor (See User's Guide) CAS=Chemical Abstract Services

TOXICITY VALUES								CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C / skin abs. soils / CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		2.0E-03	I			2.0E-03	r 0.1 330-55-2	Linuron	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
		2.0E-02	x				7439-93-2	Lithium	1.6E+03	nc	2.0E+04	nc			7.3E+02	nc		
		2.0E-01	I			2.0E-01	r 0.1 83055-99-6	Londax	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
		2.0E-02	I			2.0E-02	r 0.1 121-75-5	Malathion	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.0E-01	I			1.0E-01	r 0.1 108-31-6	Maleic anhydride	6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc		
		5.0E-01	I			5.0E-01	r y 123-33-1	Maleic hydrazide	1.7E+03	nc	2.4E+03	sat	1.8E+03	nc	3.0E+03	nc		
		1.0E-04	p			1.0E-04	r 0.1 109-77-3	Malononitrile	6.1E+00	nc	6.2E+01	nc	3.7E-01	nc	3.6E+00	nc		
		3.0E-02	h			3.0E-02	r 0.1 8018-01-7	Mancozeb	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc		
6.0E-02	o	5.0E-03	I	6.0E-02	r	5.0E-03	r 0.1 12427-38-2	Maneb	8.1E+00	ca*	2.9E+01	ca	1.1E-01	ca	1.1E+00	ca		
		2.4E-02	I			1.4E-05	I 7439-96-5	Manganese and compounds+++	1.8E+03	nc	1.9E+04	nc	5.1E-02	nc	8.8E+02	nc		
		9.0E-05	h			9.0E-05	r 0.1 950-10-7	Mephosfolan	5.5E+00	nc	5.5E+01	nc	3.3E-01	nc	3.3E+00	nc		
		3.0E-02	I			3.0E-02	r 0.1 24307-26-4	Mepiquat chloride	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc		
2.9E-02	n	1.0E-01	n	2.9E-02	r	1.0E-01	r 0.1 149-30-4	2-Mercaptobenzothiazole	1.7E+01	ca	5.9E+01	ca	2.3E-01	ca	2.3E+00	ca		
		3.0E-04	I				7487-94-7	Mercury and compounds	2.3E+01	nc	3.1E+02	nc			1.1E+01	nc		
						8.6E-05	I 7439-97-6	Mercury (elemental)					3.1E-01	nc				
		1.0E-04	I				0.1 22967-92-6	Mercury (methyl)	6.1E+00	nc	6.2E+01	nc			3.6E+00	nc		
		3.0E-05	I			3.0E-05	r 0.1 150-50-5	Merphos	1.8E+00	nc	1.8E+01	nc	1.1E-01	nc	1.1E+00	nc		
		3.0E-05	I			3.0E-05	r 0.1 78-48-8	Merphos oxide	1.8E+00	nc	1.8E+01	nc	1.1E-01	nc	1.1E+00	nc		
		6.0E-02	I			6.0E-02	r 0.1 57837-19-1	Metalaxyl	3.7E+03	nc	3.7E+04	nc	2.2E+02	nc	2.2E+03	nc		
		1.0E-04	I			2.0E-04	h y 126-98-7	Methacrylonitrile	2.1E+00	nc	8.4E+00	nc	7.3E-01	nc	1.0E+00	nc		
		5.0E-05	I			5.0E-05	r 0.1 10265-92-6	Methamidophos	3.1E+00	nc	3.1E+01	nc	1.8E-01	nc	1.8E+00	nc		
		5.0E-01	I			5.0E-01	r 0.1 67-56-1	Methanol	3.1E+04	nc	1.0E+05	max	1.8E+03	nc	1.8E+04	nc		
		1.0E-03	I			1.0E-03	r 0.1 950-37-8	Methidathion	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
		2.5E-02	I			2.5E-02	r y 16752-77-5	Methomyl	4.4E+01	nc	1.5E+02	nc	9.1E+01	nc	1.5E+02	nc		
		5.0E-03	I			5.0E-03	r 0.1 72-43-5	Methoxychlor	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc	1.6E+02	8.0E+00
		1.0E-03	h			5.7E-03	I 0.1 109-86-4	2-Methoxyethanol	6.1E+01	nc	6.2E+02	nc	2.1E+01	nc	3.6E+01	nc		
		2.0E-03	h			2.0E-03	r 0.1 110-49-6	2-Methoxyethanol acetate	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
4.6E-02	h			4.6E-02	r		0.1 99-59-2	2-Methoxy-5-nitroaniline	1.1E+01	ca	3.7E+01	ca	1.5E-01	ca	1.5E+00	ca		
		1.0E+00	h			1.0E+00	r y 79-20-9	Methyl acetate	2.2E+04	nc	9.2E+04	nc	3.7E+03	nc	6.1E+03	nc		
		3.0E-02	h			3.0E-02	r y 96-33-3	Methyl acrylate	7.0E+01	nc	2.3E+02	nc	1.1E+02	nc	1.8E+02	nc		
2.4E-01	h			2.4E-01	r		0.1 95-53-4	2-Methylaniline (o-toluidine)	2.0E+00	ca	7.2E+00	ca	2.8E-02	ca	2.8E-01	ca		
1.8E-01	h			1.8E-01	r		0.1 636-21-5	2-Methylaniline hydrochloride	2.7E+00	ca	9.6E+00	ca	3.7E-02	ca	3.7E-01	ca		
		5.0E-04	I			5.0E-04	r 0.1 94-74-6	2-Methyl-4-chlorophenoxyacetic acid	3.1E+01	nc	3.1E+02	nc	1.8E+00	nc	1.8E+01	nc		
		1.0E-02	I			1.0E-02	r 0.1 94-81-5	4-(2-Methyl-4-chlorophenoxy) butyric acid	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
		1.0E-03	I			1.0E-03	r 0.1 93-65-2	2-(2-Methyl-4-chlorophenoxy) propionic acid	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
		1.0E-03	I			1.0E-03	r 0.1 16484-77-8	2-(2-Methyl-1,4-chlorophenoxy) propionic acid	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
		8.6E-01	r			8.6E-01	h y 108-87-2	Methylcyclohexane	2.6E+03	nc	8.7E+03	nc	3.1E+03	nc	5.2E+03	nc		
2.5E-01	h			2.5E-01	r		0.1 101-77-9	4,4'-Methylenebisbenzeneamine	1.9E+00	ca	6.9E+00	ca	2.7E-02	ca	2.7E-01	ca		
1.3E-01	h	7.0E-04	h	1.3E-01	h	7.0E-04	r 0.1 101-14-4	4,4'-Methylene bis(2-chloroaniline)	3.7E+00	ca*	1.3E+01	ca*	5.2E-02	ca*	5.2E-01	ca*		
4.6E-02	I			4.6E-02	r		0.1 101-61-1	4,4'-Methylene bis(N,N'-dimethyl)aniline	1.1E+01	ca	3.7E+01	ca	1.5E-01	ca	1.5E+00	ca		
		1.0E-02	h			1.0E-02	r y 74-95-3	Methylene bromide	6.7E+01	nc	2.3E+02	nc	3.7E+01	nc	6.1E+01	nc		
7.5E-03	I	6.0E-02	I	1.6E-03	I	8.6E-01	h y 75-09-2	Methylene chloride	9.1E+00	ca	2.1E+01	ca	4.1E+00	ca	4.3E+00	ca	2.0E-02	1.0E-03

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TOXICITY VALUES									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		1.7E-04	r			1.7E-04	i	0.1	101-68-8	4,4'-Methylene diphenyl diisocyanate	1.0E+01	nc	1.0E+02	nc	6.2E-01	nc	6.2E+00	nc		
		6.0E-01	i			1.4E+00	i y		78-93-3	**Methyl ethyl ketone (2-Butanone)**	2.2E+04	nc	1.1E+05	nc	5.1E+03	nc	7.0E+03	nc		
		8.0E-02	h			8.6E-01	i y		108-10-1	**Methyl Isobutyl ketone**	5.3E+03	nc	4.7E+04	nc	3.1E+03	nc	2.0E+03	nc		
		5.7E-04	r			5.7E-04	n	0.1	74-93-1	Methyl Mercaptan	3.5E+01	nc	3.5E+02	nc	2.1E+00	nc	2.1E+01	nc		
		1.4E+00	i			2.0E-01	i y		80-62-6	Methyl methacrylate	2.2E+03	nc	2.7E+03	sat	7.3E+02	nc	1.4E+03	nc		
3.3E-02	h			3.3E-02	r			0.1	99-55-8	2-Methyl-5-nitroaniline	1.5E+01	ca	5.2E+01	ca	2.0E-01	ca	2.0E+00	ca		
		2.5E-04	i			2.5E-04	r	0.1	298-00-0	Methyl parathion	1.5E+01	nc	1.5E+02	nc	9.1E-01	nc	9.1E+00	nc		
		5.0E-02	i			5.0E-02	r	0.1	95-48-7	2-Methylphenol	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc	1.5E+01	8.0E-01
		5.0E-02	i			5.0E-02	r	0.1	108-39-4	3-Methylphenol	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
		5.0E-03	h			5.0E-03	r	0.1	106-44-5	4-Methylphenol	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.0E-02	p			2.0E-02	r	0.1	993-13-5	Methyl phosphonic acid	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		6.0E-03	h			1.1E-02	h y		25013-15-4	Methyl styrene (mixture)	1.3E+02	nc	5.4E+02	nc	4.2E+01	nc	6.0E+01	nc		
		7.0E-02	h			7.0E-02	r y		98-83-9	Methyl styrene (alpha)	6.8E+02	sat	6.8E+02	sat	2.6E+02	nc	4.3E+02	nc		
1.8E-03	c	8.6E-01	r	9.1E-04	c	8.6E-01	i y		1634-04-4	**Methyl tertbutyl ether (MTBE)**	3.2E+01	ca	7.0E+01	ca	7.4E+00	ca	1.1E+01	ca		
		1.5E-01	I			1.5E-01	r	0.1	51218-45-2	Metolaclor (Dual)	9.2E+03	nc	9.2E+04	nc	5.5E+02	nc	5.5E+03	nc		
		2.5E-02	I			2.5E-02	r	0.1	21087-64-9	Metribuzin	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc		
1.8E+00	x	2.0E-04	I	1.8E+00	r	2.0E-04	r	0.1	2385-85-5	Mirex	2.7E-01	ca*	9.6E-01	ca	3.7E-03	ca	3.7E-02	ca		
		2.0E-03	I			2.0E-03	r	0.1	2212-67-1	Molinate	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
		5.0E-03	I						7439-98-7	Molybdenum	3.9E+02	nc	5.1E+03	nc			1.8E+02	nc		
		1.0E-01	I			1.0E-01	r	0.1	10599-90-3	Monochloramine	6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc		
		2.0E-03	I			2.0E-03	r	0.1	300-76-5	Naled	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
		1.0E-01	I			1.0E-01	r	0.1	15299-99-7	Napropamide	6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc		
		2.0E-02	i						7440-02-0	Nickel (soluble salts)	1.6E+03	nc	2.0E+04	nc			7.3E+02	nc	1.3E+02	7.0E+00
				8.4E-01	i					Nickel refinery dust					8.0E-03	ca				
				1.7E+00	i				12035-72-2	Nickel subsulfide			1.1E+04	ca	4.0E-03	ca				
Tap Water PRG Based on Infant NOAEL (see IRIS)									14797-55-8	Nitrate+++							1.0E+04	nc		
Tap Water PRG Based on Infant NOAEL (see IRIS)									14797-65-0	Nitrite+++							1.0E+03	nc		
		3.0E-03	p			3.0E-05	p	0.1	88-74-4	**2-Nitroaniline**	1.8E+02	nc	1.8E+03	nc	1.1E-01	nc	1.1E+02	nc		
2.1E-02	p	3.0E-04	p	2.1E-02	r	3.0E-04	p	0.1	99-09-2	**3-Nitroaniline**	1.8E+01	nc	8.2E+01	ca**	3.2E-01	ca**	3.2E+00	ca**		
2.1E-02	p	3.0E-03	p	2.1E-02	r	1.0E-03	p	0.1	100-01-6	**4-Nitroaniline**	2.3E+01	ca**	8.2E+01	ca*	3.2E-01	ca*	3.2E+00	ca*		
		5.0E-04	i			5.7E-04	h y		98-95-3	Nitrobenzene	2.0E+01	nc	1.0E+02	nc	2.1E+00	nc	3.4E+00	nc	1.0E-01	7.0E-03
		7.0E-02	h			7.0E-02	r	0.1	67-20-9	Nitrofurantoin	4.3E+03	nc	4.3E+04	nc	2.6E+02	nc	2.6E+03	nc		
1.5E+00	h			1.5E+00	r			0.1	59-87-0	Nitrofurazone	3.2E-01	ca	1.1E+00	ca	4.5E-03	ca	4.5E-02	ca		
1.4E-02	n			1.4E-02	r			0.1	55-63-0	Nitroglycerin	3.5E+01	ca	1.2E+02	ca	4.8E-01	ca	4.8E+00	ca		
		1.0E-01	I			1.0E-01	r	0.1	556-88-7	Nitroguanidine	6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc		
9.4E+00	r	5.7E-03	r	9.4E+00	h	5.7E-03	I y		79-46-9	2-Nitropropane					7.2E-04	ca	1.2E-03	ca		
5.4E+00	i			5.6E+00	i		y		924-16-3	N-Nitrosodi-n-butylamine	2.4E-02	ca	5.8E-02	ca	1.2E-03	ca	2.0E-03	ca		
2.8E+00	i			2.8E+00	r			0.1	1116-54-7	N-Nitrosodiethanolamine	1.7E-01	ca	6.2E-01	ca	2.4E-03	ca	2.4E-02	ca		
1.5E+02	i			1.5E+02	i			0.1	55-18-5	N-Nitrosodiethylamine	3.2E-03	ca	1.1E-02	ca	4.5E-05	ca	4.5E-04	ca		
5.1E+01	I	8.0E-06	p	4.9E+01	I	8.0E-06	r	0.1	62-75-9	**N-Nitrosodimethylamine**	9.5E-03	ca*	3.4E-02	ca	1.4E-04	ca	1.3E-03	ca		
4.9E-03	I	2.0E-02	p	4.9E-03	r	2.0E-02	c r	0.1	86-30-6	**N-Nitrosodiphenylamine**	9.9E+01	ca*	3.5E+02	ca*	1.4E+00	ca*	1.4E+01	ca*	1.0E+00	6.0E-02
7.0E+00				7.0E+00	r			0.1	621-64-7	N-Nitroso di-n-propylamine	6.9E-02	ca	2.5E-01	ca	9.6E-04	ca	9.6E-03	ca	5.0E-05	2.0E-06

Key : SFo,i=Cancer Slope Factor oral, inhalation RfDo,i=Reference Dose oral, inhalation i=IRIS p=PPRTV c=California EPA n=NCEA h=HEAST x=Withdrawn r=Route-extrapolation ca=Cancer PRG nc= Noncancer PRG ca* (where: nc PRG < 100X ca PRG) ca** (where nc PRG < 10X ca PRG) ++++=Non-Standard Method Applied (See User's Guide) sat=Soil Saturation (See User's Guide) max=Ceiling limit (See User's Guide) DAF=Dilution Attenuation Factor (See User's Guide) CAS=Chemical Abstract Services

TOXICITY VALUES									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C	skin abs. soils CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
2.2E+01	i			2.2E+01	r			0.1 10595-95-6	N-Nitroso-N-methylethylamine	2.2E-02	ca	7.8E-02	ca	3.1E-04	ca	3.1E-03	ca		
2.1E+00	i			2.1E+00	i			0.1 930-55-2	N-Nitrosopyrrolidine	2.3E-01	ca	8.2E-01	ca	3.1E-03	ca	3.2E-02	ca		
		2.0E-02	p			2.0E-02	r	y 99-08-1	**m-Nitrotoluene**	7.3E+02	nc	1.0E+03	sat	7.3E+01	nc	1.2E+02	nc		
2.3E-01	p	1.0E-02	h	2.3E-01	r	1.0E-02	r	y 88-72-2	**o-Nitrotoluene**	8.8E-01	ca	2.2E+00	ca	2.9E-02	ca	4.9E-02	ca		
1.7E-02	p	1.0E-02	p	1.7E-02	r	1.0E-02	r	y 99-99-0	**p-Nitrotoluene**	1.2E+01	ca*	3.0E+01	ca*	4.0E-01	ca*	6.6E-01	ca*		
		4.0E-02	i			4.0E-02	r	0.1 27314-13-2	Norflurazon	2.4E+03	nc	2.5E+04	nc	1.5E+02	nc	1.5E+03	nc		
		7.0E-04	i			7.0E-04	r	0.1 85509-19-9	NuStar	4.3E+01	nc	4.3E+02	nc	2.6E+00	nc	2.6E+01	nc		
		3.0E-03	i			3.0E-03	r	0.1 32536-52-0	Octabromodiphenyl ether	1.8E+02	nc	1.8E+03	nc	1.1E+01	nc	1.1E+02	nc		
		2.0E-03	h			2.0E-03	r	0.1 152-16-9	Octamethylpyrophosphoramide	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
		5.0E-02	i			5.0E-02	r	0.1 19044-88-3	Oryzalin	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
		5.0E-03	i			5.0E-03	r	0.1 19666-30-9	Oxadiazon	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.5E-02	i			2.5E-02	r	0.1 23135-22-0	Oxamyl	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc		
		3.0E-03	i			3.0E-03	r	0.1 42874-03-3	Oxyfluorfen	1.8E+02	nc	1.8E+03	nc	1.1E+01	nc	1.1E+02	nc		
		1.3E-02	i			1.3E-02	r	0.1 76738-62-0	Paclobutrazol	7.9E+02	nc	8.0E+03	nc	4.7E+01	nc	4.7E+02	nc		
		4.5E-03	i			4.5E-03	r	0.1 4685-14-7	Paraquat	2.7E+02	nc	2.8E+03	nc	1.6E+01	nc	1.6E+02	nc		
		6.0E-03	h			6.0E-03	r	0.1 56-38-2	Parathion	3.7E+02	nc	3.7E+03	nc	2.2E+01	nc	2.2E+02	nc		
		5.0E-02	h			5.0E-02	r	0.1 1114-71-2	Pebulate	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
		4.0E-02	i			4.0E-02	r	0.1 40487-42-1	Pendimethalin	2.4E+03	nc	2.5E+04	nc	1.5E+02	nc	1.5E+03	nc		
2.3E-02	h			2.3E-02	r			0.1 87-84-3	Pentabromo-6-chloro cyclohexane	2.1E+01	ca	7.5E+01	ca	2.9E-01	ca	2.9E+00	ca		
		2.0E-03	i			2.0E-03	r	0.1 32534-81-9	Pentabromodiphenyl ether	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
		8.0E-04	i			8.0E-04	r	0.1 608-93-5	Pentachlorobenzene	4.9E+01	nc	4.9E+02	nc	2.9E+00	nc	2.9E+01	nc		
2.6E-01	h	3.0E-03	i	2.6E-01	r	3.0E-03	r	0.1 82-68-8	Pentachloronitrobenzene	1.9E+00	ca*	6.6E+00	ca	2.6E-02	ca	2.6E-01	ca		
1.2E-01	i	3.0E-02	i	1.2E-01	r	3.0E-02	r	0.25 87-86-5	Pentachlorophenol	3.0E+00	ca	9.0E+00	ca	5.6E-02	ca	5.6E-01	ca	3.0E-02	1.0E-03
		1.0E-04	n					7601-90-3	Perchlorate	7.8E+00	ca/nc	1.0E+02	ca/nc			3.6E+00	ca/nc		
		5.0E-02	i			5.0E-02	r	0.1 52645-53-1	Permethrin	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
		2.5E-01	i			2.5E-01	r	0.1 13684-63-4	Phenmedipham	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		3.0E-01	i			3.0E-01	r	0.1 108-95-2	**Phenol**	1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc	1.0E+02	5.0E+00
		2.0E-03	n			2.0E-03	r	0.1 92-84-2	Phenothiazine	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
		6.0E-03	i			6.0E-03	r	0.1 108-45-2	m-Phenylenediamine	3.7E+02	nc	3.7E+03	nc	2.2E+01	nc	2.2E+02	nc		
4.7E-02	h			4.7E-02	r			0.1 95-54-5	**o-Phenylenediamine**	1.0E+01	ca	3.7E+01	ca	1.4E-01	ca	1.4E+00	ca		
		1.9E-01	h			1.9E-01	r	0.1 106-50-3	p-Phenylenediamine	1.2E+04	nc	1.0E+05	max	6.9E+02	nc	6.9E+03	nc		
		8.0E-05	i			8.0E-05	r	0.1 62-38-4	Phenylmercuric acetate	4.9E+00	nc	4.9E+01	nc	2.9E-01	nc	2.9E+00	nc		
1.9E-03	h			1.9E-03	r			0.1 90-43-7	2-Phenylphenol	2.5E+02	ca	8.9E+02	ca	3.5E+00	ca	3.5E+01	ca		
		2.0E-04	h			2.0E-04	r	0.1 298-02-2	Phorate	1.2E+01	nc	1.2E+02	nc	7.3E-01	nc	7.3E+00	nc		
		2.0E-02	i			2.0E-02	r	0.1 732-11-6	Phosmet	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		3.0E-04	i			8.6E-05	i	0.1 7803-51-2	Phosphine	1.8E+01	nc	1.8E+02	nc	3.1E-01	nc	1.1E+01	nc		
						2.9E-03	i	7664-38-2	Phosphoric acid					1.0E+01	nc				
		2.0E-05	i					7723-14-0	Phosphorus (white)	1.6E+00	nc	2.0E+01	nc			7.3E-01	nc		
		1.0E+00	h			1.0E+00	r	0.1 100-21-0	p-Phthalic acid	6.1E+04	nc	1.0E+05	max	3.7E+03	nc	3.6E+04	nc		
		2.0E+00	i			3.4E-02	h	0.1 85-44-9	Phthalic anhydride	1.0E+05	max	1.0E+05	max	1.2E+02	nc	7.3E+04	nc		
		7.0E-02	i			7.0E-02	r	0.1 1918-02-1	Picloram	4.3E+03	nc	4.3E+04	nc	2.6E+02	nc	2.6E+03	nc		
		1.0E-02	i			1.0E-02	r	0.1 29232-93-7	Pirimiphos-methyl	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		

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TOXICITY VALUES									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
8.9E+00	h	7.0E-06	h	8.9E+00	r	7.0E-06	r	0.1		Polybrominated biphenyls	5.5E-02	ca**	1.9E-01	ca*	7.6E-04	ca*	7.6E-03	ca*		
										Polychlorinated biphenyls (PCBs, see IRIS)										
7.0E-02	i	7.0E-05	i	7.0E-02	i	7.0E-05	r	0.14	12674-11-2	PCBs (unspeciated mixture, low risk, e.g. Aroclor 1016)	3.9E+00	nc	2.1E+01	ca**	9.6E-02	ca**	9.6E-01	ca**		
2.0E+00	i	2.0E-05	i	2.0E+00	i	2.0E-05	r	0.14	11097-69-1	PCBs (unspeciated mixture, high risk, e.g. Aroclor 1254)	2.2E-01	ca**	7.4E-01	ca*	3.4E-03	ca*	3.4E-02	ca*		
4.5E+00	n			4.5E+00	r			0.1	61788-33-8	Polychlorinated terphenyls	1.1E-01	ca	3.8E-01	ca	1.5E-03	ca	1.5E-02	ca		
										Polynuclear aromatic hydrocarbons (PAHs)										
		6.0E-02	i			6.0E-02	r	y	83-32-9	Acenaphthene	3.7E+03	nc	2.9E+04	nc	2.2E+02	nc	3.7E+02	nc	5.7E+02	2.9E+01
		3.0E-01	i			3.0E-01	r	y	120-12-7	Anthracene	2.2E+04	nc	1.0E+05	max	1.1E+03	nc	1.8E+03	nc	1.2E+04	5.9E+02
7.3E-01	n			7.3E-01	r			0.13	56-55-3	Benz[a]anthracene	6.2E-01	ca	2.1E+00	ca	9.2E-03	ca	9.2E-02	ca	2.0E+00	8.0E-02
7.3E-01	n			7.3E-01	r			0.13	205-99-2	Benzo[b]fluoranthene	6.2E-01	ca	2.1E+00	ca	9.2E-03	ca	9.2E-02	ca	5.0E+00	2.0E-01
7.3E-02	n			7.3E-02	r			0.13	207-08-9	Benzo[k]fluoranthene	6.2E+00	ca	2.1E+01	ca	9.2E-02	ca	9.2E-01	ca	4.9E+01	2.0E+00
1.2E+00	c			3.9E-01	c			0.13	207-08-9	"CAL-Modified PRG"	3.8E-01	ca	1.3E+00	ca	1.7E-02	ca	5.6E-02	ca		
7.3E+00	i			7.3E+00	r			0.13	50-32-8	Benzo[a]pyrene	6.2E-02	ca	2.1E-01	ca	9.2E-04	ca	9.2E-03	ca	8.0E+00	4.0E-01
7.3E-03	n			7.3E-03	r			0.13	218-01-9	Chrysene	6.2E+01	ca	2.1E+02	ca	9.2E-01	ca	9.2E+00	ca	1.6E+02	8.0E+00
1.2E-01	c			3.9E-02	c			0.13		"CAL-Modified PRG"	3.8E+00	ca	1.3E+01	ca	1.7E-01	ca	5.6E-01	ca		
7.3E+00	n			7.3E+00	r			0.13	53-70-3	Dibenz[ah]anthracene	6.2E-02	ca	2.1E-01	ca	9.2E-04	ca	9.2E-03	ca	2.0E+00	8.0E-02
		4.0E-02	i			4.0E-02	r	0.13	206-44-0	Fluoranthene	2.3E+03	nc	2.2E+04	nc	1.5E+02	nc	1.5E+03	nc	4.3E+03	2.1E+02
		4.0E-02	i			4.0E-02	r	y	86-73-7	Fluorene	2.7E+03	nc	2.6E+04	nc	1.5E+02	nc	2.4E+02	nc	5.6E+02	2.8E+01
7.3E-01	n			7.3E-01	r			0.13	193-39-5	Indeno[1,2,3-cd]pyrene	6.2E-01	ca	2.1E+00	ca	9.2E-03	ca	9.2E-02	ca	1.4E+01	7.0E-01
		2.0E-02	i			8.6E-04	i	y	91-20-3	Naphthalene	5.6E+01	nc	1.9E+02	nc	3.1E+00	nc	6.2E+00	nc	8.4E+01	4.0E+00
1.2E-01	r			1.2E-01	c					**"CAL-Modified PRG"**	1.7E+00	ca	4.2E+00	ca	5.6E-02	ca	9.3E-02	ca		
		3.0E-02	i			3.0E-02	r	y	129-00-0	Pyrene	2.3E+03	nc	2.9E+04	nc	1.1E+02	nc	1.8E+02	nc	4.2E+03	2.1E+02
1.5E-01	i	9.0E-03	i	1.5E-01	r	9.0E-03	r	0.1	67747-09-5	Prochloraz	3.2E+00	ca	1.1E+01	ca	4.5E-02	ca	4.5E-01	ca		
		6.0E-03	h			6.0E-03	r	0.1	26399-36-0	Profluralin	3.7E+02	nc	3.7E+03	nc	2.2E+01	nc	2.2E+02	nc		
		1.5E-02	i			1.5E-02	r	0.1	1610-18-0	Prometon	9.2E+02	nc	9.2E+03	nc	5.5E+01	nc	5.5E+02	nc		
		4.0E-03	i			4.0E-03	r	0.1	7287-19-6	Prometryn	2.4E+02	nc	2.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
		7.5E-02	i			7.5E-02	r	0.1	23950-58-5	Pronamide	4.6E+03	nc	4.6E+04	nc	2.7E+02	nc	2.7E+03	nc		
		1.3E-02	i			1.3E-02	r	0.1	1918-16-7	Propachlor	7.9E+02	nc	8.0E+03	nc	4.7E+01	nc	4.7E+02	nc		
		5.0E-03	i			5.0E-03	r	0.1	709-98-8	Propanil	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.0E-02	i			2.0E-02	r	0.1	2312-35-8	Propargite	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-03	i			2.0E-03	r	0.1	107-19-7	Propargyl alcohol	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc		
		2.0E-02	i			2.0E-02	r	0.1	139-40-2	Propazine	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-02	i			2.0E-02	r	0.1	122-42-9	Propham	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.3E-02	i			1.3E-02	r	0.1	60207-90-1	Propiconazole	7.9E+02	nc	8.0E+03	nc	4.7E+01	nc	4.7E+02	nc		
									98-82-8	Isopropylbenzene (see Cumene)										
		4.0E-02	n			4.0E-02	r	y	103-65-1	n-Propylbenzene	2.4E+02	sat	2.4E+02	sat	1.5E+02	nc	2.4E+02	nc		
		5.0E-01	p			8.6E-04	p	0.1	57-55-6	Propylene glycol	3.0E+04	nc	1.0E+05	max	3.1E+00	nc	1.8E+04	nc		
		7.0E-01	h			7.0E-01	r	0.1	52125-53-8	Propylene glycol, monoethyl ether	4.3E+04	nc	1.0E+05	max	2.6E+03	nc	2.6E+04	nc		
		7.0E-01	h			5.7E-01	I	0.1	107-98-2	Propylene glycol, monomethyl ether	4.3E+04	nc	1.0E+05	max	2.1E+03	nc	2.6E+04	nc		
2.4E-01	i	8.6E-03	r	1.3E-02	i	8.6E-03	i	y	75-56-9	Propylene oxide	1.9E+00	ca*	6.6E+00	ca*	5.2E-01	ca*	2.2E-01	ca		
		2.5E-01	i			2.5E-01	r	0.1	81335-77-5	Pursuit	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		2.5E-02	i			2.5E-02	r	0.1	51630-58-1	Pydrin	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc		

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TOXICITY VALUES								CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		1.0E-03	I			1.0E-03	r		0.1	110-86-1	Pyridine	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
		5.0E-04	I			5.0E-04	r		0.1	13593-03-8	Quinalphos	3.1E+01	nc	3.1E+02	nc	1.8E+00	nc	1.8E+01	nc		
3.0E+00	I			3.0E+00	r				0.1	91-22-5	Quinoline	1.6E-01	ca	5.7E-01	ca	2.2E-03	ca	2.2E-02	ca		
1.1E-01	I	3.0E-03	I	1.1E-01	r	3.0E-03	r		0.1	121-82-4	RDX (Cyclonite)	4.4E+00	ca*	1.6E+01	ca	6.1E-02	ca	6.1E-01	ca		
		3.0E-02	I			3.0E-02	r		0.1	10453-86-8	Resmethrin	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc		
		5.0E-02	h			5.0E-02	r		0.1	299-84-3	Ronnel	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		
		4.0E-03	I			4.0E-03	r		0.1	83-79-4	Rotenone	2.4E+02	nc	2.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
		2.5E-02	I			2.5E-02	r		0.1	78587-05-0	Savey	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc		
		5.0E-03	I						0.1	7783-00-8	Selenious Acid	3.1E+02	nc	3.1E+03	nc			1.8E+02	nc		
		5.0E-03	I							7782-49-2	Selenium	3.9E+02	nc	5.1E+03	nc			1.8E+02	nc	5.0E+00	3.0E-01
		5.0E-03	h						0.1	630-10-4	Selenourea	3.1E+02	nc	3.1E+03	nc			1.8E+02	nc		
		9.0E-02	I			9.0E-02	r		0.1	74051-80-2	Sethoxydim	5.5E+03	nc	5.5E+04	nc	3.3E+02	nc	3.3E+03	nc		
		5.0E-03	I							7440-22-4	Silver and compounds	3.9E+02	nc	5.1E+03	nc			1.8E+02	nc	3.4E+01	2.0E+00
1.2E-01	h	5.0E-03	I	1.2E-01	r	5.00E-03	r		0.1	122-34-9	Simazine	4.1E+00	ca*	1.4E+01	ca	5.6E-02	ca	5.6E-01	ca		
		4.0E-03	I							26628-22-8	Sodium azide										
2.7E-01	h	3.0E-02	I	2.7E-01	r	3.0E-02	r		0.1	148-18-5	Sodium diethyldithiocarbamate	1.8E+00	ca	6.4E+00	ca	2.5E-02	ca	2.5E-01	ca		
		2.0E-05	I			2.0E-05	r		0.1	62-74-8	Sodium fluoroacetate	1.2E+00	nc	1.2E+01	nc	7.3E-02	nc	7.3E-01	nc		
		1.0E-03	h			1.0E-03	r		0.1	13718-26-8	Sodium metavanadate	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
		6.0E-01	I							7440-24-6	Strontium, stable	4.7E+04	nc	1.0E+05	max			2.2E+04	nc		
		3.0E-04	I			3.0E-04	r		0.1	57-24-9	Strychnine	1.8E+01	nc	1.8E+02	nc	1.1E+00	nc	1.1E+01	nc		
		2.0E-01	I			2.9E-01	I	y		100-42-5	Styrene	1.7E+03	sat	1.7E+03	sat	1.1E+03	nc	1.6E+03	nc	4.0E+00	2.0E-01
		5.0E-03	p			5.0E-03	r			80-07-9	**1,1'-Sulfonylbis (4-chlorobenzene)**	3.9E+02	nc	5.1E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.5E-02	I			2.5E-02	r		0.1	88671-89-0	Systhane	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc		
1.5E+05	h			1.5E+05	h				0.03	1746-01-6	2,3,7,8-TCDD (dioxin)	3.9E-06	ca	1.6E-05	ca	4.5E-08	ca	4.5E-07	ca		
		7.0E-02	I			7.0E-02	r		0.1	34014-18-1	Tebuthiuron	4.3E+03	nc	4.3E+04	nc	2.6E+02	nc	2.6E+03	nc		
		2.0E-02	h			2.0E-02	r		0.1	3383-96-8	Temephos	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.3E-02	I			1.3E-02	r		0.1	5902-51-2	Terbacil	7.9E+02	nc	8.0E+03	nc	4.7E+01	nc	4.7E+02	nc		
		2.5E-05	h			2.5E-05	r		0.1	13071-79-9	Terbufos	1.5E+00	nc	1.5E+01	nc	9.1E-02	nc	9.1E-01	nc		
		1.0E-03	I			1.0E-03	r		0.1	886-50-0	Terbutryn	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
		3.0E-04	I			3.0E-04	r		0.1	95-94-3	1,2,4,5-Tetrachlorobenzene	1.8E+01	nc	1.8E+02	nc	1.1E+00	nc	1.1E+01	nc		
2.6E-02	I	3.0E-02	I	2.6E-02	I	3.0E-02	r	y		630-20-6	1,1,1,2-Tetrachloroethane	3.2E+00	ca	7.3E+00	ca	2.6E-01	ca	4.3E-01	ca		
2.0E-01	I	6.0E-02	p	2.0E-01	I	6.0E-02	r	y		79-34-5	1,1,2,2-Tetrachloroethane	4.1E-01	ca	9.3E-01	ca	3.3E-02	ca	5.5E-02	ca	3.0E-03	2.0E-04
5.4E-01	c	1.0E-02	I	2.1E-02	c	1.0E-02	c	y		127-18-4	**Tetrachloroethylene (PCE)**	4.8E-01	ca*	1.3E+00	ca	3.2E-01	ca	1.0E-01	ca	6.0E-02	3.0E-03
		3.0E-02	I			3.0E-02	r		0.1	58-90-2	2,3,4,6-Tetrachlorophenol	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc		
2.0E+01	h			2.0E+01	r				0.1	5216-25-1	p,a,a,a-Tetrachlorotoluene	2.4E-02	ca	8.6E-02	ca	3.4E-04	ca	3.4E-03	ca		
2.4E-02	h	3.0E-02	I	2.4E-02	r	3.0E-02	r		0.1	961-11-5	Tetrachlorovinphos	2.0E+01	ca*	7.2E+01	ca	2.8E-01	ca	2.8E+00	ca		
		5.0E-04	I			5.0E-04	r		0.1	3689-24-5	Tetraethyldithiopyrophosphate	3.1E+01	nc	3.1E+02	nc	1.8E+00	nc	1.8E+01	nc		
7.6E-03	n	2.1E-01	n	6.8E-03	n	8.6E-02	n	y		109-99-9	Tetrahydrofuran	9.4E+00	ca	2.1E+01	ca	9.9E-01	ca	1.6E+00	ca		
		6.6E-05	I							7440-28-0	Thallium and compounds+++	5.2E+00	nc	6.7E+01	nc			2.4E+00	nc		
		1.0E-02	I			1.0E-02	r		0.1	28249-77-6	Thiobencarb	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
		5.0E-02	n			5.0E-02	r		0.1	N/A	Thiocyanate	3.1E+03	nc	1.0E+05	max	1.8E+02	nc	1.8E+03	nc		
		3.0E-04	h			3.0E-04	r		0.1	39196-18-4	Thiofanox	1.8E+01	nc	1.8E+02	nc	1.1E+00	nc	1.1E+01	nc		

Key : SFo,I=Cancer Slope Factor oral, Inhalation RfDo,I=Reference Dose oral, inhalation i=IRIS p=PPRTV c=California EPA n=NCEA h=HEAST x=Withdrawn r=Route-extrapolation ca=Cancer PRG nc= Noncancer PRG ca* (where: nc PRG < 100X ca PRG)
ca** (where nc PRG < 10X ca PRG) +++=Non-Standard Method Applied (See User's Guide) sat=Soil Saturation (See User's Guide) max=Ceiling limit (See User's Guide) DAF=Dilution Attenuation Factor (See User's Guide) CAS=Chemical Abstract Services

TOXICITY VALUES									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDI (mg/kg-d)		V O C / skin abs. soils / CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		8.0E-02	I			8.0E-02	r	0.1 23564-05-8	Thiophanate-methyl	4.9E+03	nc	4.9E+04	nc	2.9E+02	nc	2.9E+03	nc		
		5.0E-03	I			5.0E-03	r	0.1 137-26-8	Thiram	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc		
		6.0E-01	h					7440-31-5	Tin (inorganic, also see tributyltin oxide)	4.7E+04	nc	1.0E+05	max			2.2E+04	nc		
		4.0E+00	n			8.6E-03	n	7440-32-6	Titanium	1.0E+05	max	1.0E+05	max	3.1E+01	nc	1.5E+05	nc		
		2.0E-01	I			1.1E-01	I	y 108-88-3	Toluene	5.2E+02	sat	5.2E+02	sat	4.0E+02	nc	7.2E+02	nc	1.2E+01	6.0E-01
3.2E+00	h			3.2E+00	r			0.1 95-80-7	Toluene-2,4-diamine	1.5E-01	ca	5.4E-01	ca	2.1E-03	ca	2.1E-02	ca		
		6.0E-01	h			6.0E-01	r	0.1 95-70-5	Toluene-2,5-diamine	3.7E+04	nc	1.0E+05	max	2.2E+03	nc	2.2E+04	nc		
		2.0E-01	h			2.0E-01	r	0.1 823-40-5	Toluene-2,6-diamine	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
1.9E-01	i			1.9E-01	r			0.1 106-49-0	p-Toluidine	2.6E+00	ca	9.1E+00	ca	3.5E-02	ca	3.5E-01	ca		
1.1E+00	I			1.1E+00	i			0.1 8001-35-2	Toxaphene	4.4E-01	ca	1.6E+00	ca	6.0E-03	ca	6.1E-02	ca	3.1E+01	2.0E+00
		7.5E-03	I			7.5E-03	r	0.1 66841-25-6	Tralomethrin	4.6E+02	nc	4.6E+03	nc	2.7E+01	nc	2.7E+02	nc		
		1.3E-02	I			1.3E-02	r	0.1 2303-17-5	Triallate	7.9E+02	nc	8.0E+03	nc	4.7E+01	nc	4.7E+02	nc		
		1.0E-02	I			1.0E-02	r	0.1 82097-50-5	Triasulfuron	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
		5.0E-03	I			5.0E-03	r	0.1 615-54-3	1,2,4-Tribromobenzene	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc		
9.2E-03	p	2.0E-01	p	9.2E-03	r	2.0E-01	r	0.1 126-73-8	**Tributyl phosphate**	5.3E+01	ca	1.9E+02	ca	7.3E-01	ca	7.3E+00	ca		
		3.0E-04	i					0.1 56-35-9	Tributyltin oxide (TBTO)	1.8E+01	nc	1.8E+02	nc			1.1E+01	nc		
3.4E-02	h			3.4E-02	r			0.1 634-93-5	2,4,6-Trichloroaniline	1.4E+01	ca	5.1E+01	ca	2.0E-01	ca	2.0E+00	ca		
2.9E-02	h			2.9E-02	r			0.1 33663-50-2	2,4,6-Trichloroaniline hydrochloride	1.7E+01	ca	5.9E+01	ca	2.3E-01	ca	2.3E+00	ca		
		1.0E-02	i			1.0E-03	p	y 120-82-1	**1,2,4-Trichlorobenzene**	6.2E+01	nc	2.2E+02	nc	3.7E+00	nc	7.2E+00	nc	5.0E+00	3.0E-01
		2.8E-01	n			6.3E-01	p	y 71-55-6	1,1,1-Trichloroethane	1.2E+03	sat	1.2E+03	sat	2.3E+03	nc	3.2E+03	nc	2.0E+00	1.0E-01
5.7E-02	I	4.0E-03	I	5.6E-02	I	4.0E-03	r	y 79-00-5	1,1,2-Trichloroethane	7.3E-01	ca*	1.6E+00	ca*	1.2E-01	ca	2.0E-01	ca	2.0E-02	9.0E-04
4.0E-01	n	3.0E-04	n	4.0E-01	n	1.0E-02	n	y 79-01-6	Trichloroethylene (TCE)	5.3E-02	ca	1.1E-01	ca	1.7E-02	ca	2.8E-02	ca	6.0E-02	3.0E-03
1.3E-02	c			7.0E-03	c	1.7E-01	c	y 79-01-6	**"CAL-Modified PRG"**	2.9E+00	ca	6.5E+00	ca	9.6E-01	ca	1.4E+00	ca		
		3.0E-01	I			2.0E-01	h	y 75-69-4	Trichlorofluoromethane	3.9E+02	nc	2.0E+03	sat	7.3E+02	nc	1.3E+03	nc		
		1.0E-01	i			1.0E-01	r	0.1 95-95-4	2,4,5-Trichlorophenol	6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc	2.7E+02	1.4E+01
1.1E-02	I	1.0E-04	n	1.1E-02	i	1.0E-04	r	0.1 88-06-2	2,4,6-Trichlorophenol	6.1E+00	nc**	6.2E+01	nc**	3.7E-01	nc**	3.6E+00	nc**	2.0E-01	8.0E-03
7.0E-02	c			7.0E-02	c			0.1 88-06-2	"CAL-Modified PRG"	6.9E+00	ca	2.5E+01	ca	9.6E-02	ca	9.6E-01	ca		
		1.0E-02	I			1.0E-02	r	0.1 93-76-5	2,4,5-Trichlorophenoxyacetic Acid	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
		8.0E-03	I			8.0E-03	r	0.1 93-72-1	2-(2,4,5-Trichlorophenoxy) propionic acid	4.9E+02	nc	4.9E+03	nc	2.9E+01	nc	2.9E+02	nc		
		5.0E-03	I			5.0E-03	r	y 598-77-6	**1,1,2-Trichloropropane**	7.1E+01	nc	2.7E+02	nc	1.6E+01	nc	3.0E+01	nc		
2.0E+00	n	6.0E-03	i	2.0E+00	r	1.4E-03	n	y 96-18-4	**1,2,3-Trichloropropane**	3.4E-02	ca	7.6E-02	ca	3.4E-03	ca	5.6E-03	ca		
		1.0E-02	p			3.0E-04	p	y 96-19-5	**1,2,3-Trichloropropene**	5.2E+00	nc	1.7E+01	nc	1.1E+00	nc	2.2E+00	nc		
		3.0E-03	I			3.0E-03	r	0.1 58138-08-2	Tridiphane	1.8E+02	nc	1.8E+03	nc	1.1E+01	nc	1.1E+02	nc		
		2.0E-03	r			2.0E-03	i	y 121-44-8	Triethylamine	2.3E+01	nc	8.6E+01	nc	7.3E+00	nc	1.2E+01	nc		
7.7E-03	I	7.5E-03	I	7.7E-03	r	7.5E-03	r	0.1 1582-09-8	Trifluralin	6.3E+01	ca**	2.2E+02	ca*	8.7E-01	ca*	8.7E+00	ca*		
		1.4E-04	r			1.4E-04	n	0.1 552-30-7	Trimellitic Anhydride (TMAN)	8.6E+00	nc	8.6E+01	nc	5.1E-01	nc	5.1E+00			
		5.0E-02	p			1.7E-03	p	y 95-63-6	1,2,4-Trimethylbenzene	5.2E+01	nc	1.7E+02	nc	6.2E+00	nc	1.2E+01	nc		
		5.0E-02	p			1.7E-03	p	y 108-67-8	1,3,5-Trimethylbenzene	2.1E+01	nc	7.0E+01	nc	6.2E+00	nc	1.2E+01	nc		
3.7E-02	h			3.7E-02	r			0.1 512-56-1	Trimethyl phosphate	1.3E+01	ca	4.7E+01	ca	1.8E-01	ca	1.8E+00	ca		
		3.0E-02	I			3.0E-02	r	0.1 99-35-4	1,3,5-Trinitrobenzene	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc		
		1.0E-02	h			1.0E-02	r	0.1 479-45-8	Trinitrophenylmethylnitramine	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc		
3.0E-02	I	5.0E-04	I	3.0E-02	r	5.0E-04	r	0.1 118-96-7	2,4,6-Trinitrotoluene	1.6E+01	ca**	5.7E+01	ca**	2.2E-01	ca**	2.2E+00	ca**		

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TOXICITY VALUES									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) "Direct Contact Exposure Pathways"								SOIL SCREENING LEVELS "Migration to Ground Water"	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFI 1/(mg/kg-d)		RfDI (mg/kg-d)		V O C / skin abs. soils / CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		2.0E-02	p			2.0E-02	r	0.1 791-28-6	**Triphenylphosphine oxide**	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc		
1.4E-02	p	3.1E-01	p	1.4E-02	r	3.1E-01	r	0.1 115-96-8	**Tris(2-chloroethyl) phosphate**	3.5E+01	ca	1.2E+02	ca	4.8E-01	ca	4.8E+00	ca		
3.2E-03	p	1.0E-01	p	3.2E-03	r	1.0E-01	r	0.1 78-42-2	**Tris(2-ethylhexyl) phosphate**	1.5E+02	ca*	5.4E+02	ca	2.1E+00	ca	2.1E+01	ca		
		2.0E-04	n					7440-61-1	Uranium (chemical toxicity only)	1.6E+01	nc	2.0E+02	nc			7.3E+00	nc		
		1.0E-03	n					7440-62-2	Vanadium and compounds	7.8E+01	nc	1.0E+03	nc			3.6E+01	nc	6.0E+03	3.0E+02
		1.0E-03	i			1.0E-03	r	0.1 1929-77-7	Vernam	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc		
		2.5E-02	i			2.5E-02	r	0.1 50471-44-8	Vinclozolin	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc		
		1.0E+00	h			5.7E-02	i	y 108-05-4	Vinyl acetate	4.3E+02	nc	1.4E+03	nc	2.1E+02	nc	4.1E+02	nc	1.7E+02	8.0E+00
1.1E-01	r	8.6E-04	r	1.1E-01	h	8.6E-04	i	y 593-60-2	Vinyl bromide (bromoethene)	1.9E-01	ca*	4.2E-01	ca*	6.1E-02	ca*	1.0E-01	ca*		
1.5E+00	i	3.0E-03	i	3.1E-02	i	2.9E-02	i	y 75-01-4	Vinyl chloride (child/adult)+++	7.9E-02	ca			1.1E-01	ca	2.0E-02	ca	1.0E-02	7.0E-04
7.5E-01	i	3.0E-03	i	1.6E-02	i	2.9E-02	i	y 75-01-4	Vinyl chloride (adult)			7.5E-01	ca						
		3.0E-04	i			3.0E-04	r	0.1 81-81-2	Warfarin	1.8E+01	nc	1.8E+02	nc	1.1E+00	nc	1.1E+01	nc		
		2.0E-01	i			2.9E-02	i	y 0.1 1330-20-7	**Xylenes**	2.7E+02	nc	4.2E+02	sat	1.1E+02	nc	2.1E+02	nc	2.1E+02	1.0E+01
		3.0E-01	i					7440-66-6	Zinc	2.3E+04	nc	1.0E+05	max			1.1E+04	nc	1.2E+04	6.2E+02
		3.0E-04	i					1314-84-7	Zinc phosphide	2.3E+01	nc	3.1E+02	nc			1.1E+01	nc		
		5.0E-02	i			5.0E-02	r	0.1 12122-67-7	Zineb	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc		

NJDEP

Soil Cleanup Criteria

SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 5/12/99)

This listing represents the combination of Tables 3-2 and 7-1 from the Department of Environmental Protection and Energy's February 3, 1992 proposed rule entitled Cleanup Standards for Contaminated Sites, N.J.A.C. 7:26D, as corrected based upon errors identified by the Department during or subsequent to the comment period as well as new toxicological or other information obtained since the rule proposal. Please refer to the respective footnotes for more detail. Notwithstanding, where the following criteria are based on human health impacts, the Department shall still consider environmental impacts when establishing site specific cleanup criteria. This along with other site-specific factors including background conditions may result in site specific cleanup criteria which differ from the criteria listed below. Therefore, this list shall not be assumed to represent approval by the Department of any remedial action or to represent the Department's opinion that a site requires remediation.

Note: Material bracketed **[thus]** is deleted and material underlined **thus** is added

Contaminant	CASRN	Residential Direct Contact Soil Cleanup Criteria (a) (b) (RDCSCC)	Non- Residential Direct Contact Soil Cleanup Criteria (a) (b) (NRDCSCC)	Impact to Ground water Soil Cleanup Criteria (b) (IGWSCC)
Acenaphthene	83-32-9	3400	10000(c)	100
Acetone (2-propanone)	67-64-1	1000(d)	1000(d)	100
Acrylonitrile	107-13-1	1	5	1
Aldrin	309-00-2	0.040	0.17	50
Anthracene	120-12-7	10000(c)	10000(c)	100
Antimony	7440-36-0	14	340	(h)
Arsenic	7440-38-2	20 (e)	20 (e)	(h)
Barium	7440-39-3	700	47000(n)	(h)
Benzene	71-43-2	3	13	1
Benzo(b)fluoranthene (3,4-Benzofluoranthene)	205-99-2	0.9	4	50
Benzo(a)anthracene (1,2-Benzanthracene)	56-55-3	0.9	4	500
Benzo(a)pyrene (BaP)	50-32-8	0.66(f)	0.66(f)	100
Benzo(k)fluoranthene	207-08-9	0.9	4	500
Benzyl Alcohol	100-51-6	10000(c)	10000(c)	50
Beryllium	7440-41-7	**[1(f)]** **2 (e)**	**[1(f)]** **2 (e)**	(h)
Bis(2-chloroethyl) ether	111-44-4	0.66(f)	3	10

SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 5/12/99)

Contaminant	CASRN	(RDCSCC)	(NRDCSCC)	(IGWSCC)
Bis(2-chloroisopropyl)ether	108-60-1	2300	10000 (c)	10
Bis(2-ethylhexyl) phthalate	117-81-7	49	210	100
Bromodichloromethane (Dichlorobromomethane)	75-27-4	11	46	1
Bromoform	75-25-2	86	370	1
Bromomethane (Methyl bromide)	74-83-9	79	1000 (d)	1
2-Butanone (Methyl ethyl ketone) (MEK)	78-93-3	1000 (d)	1000 (d)	50
Butylbenzyl phthalate	85-68-7	1100	10000 (c)	100
Cadmium	7440-43-9	[1] 39	100	(h)
Carbon tetrachloride	56-23-5	2 (k)	4 (k)	1
4-Chloroaniline (*p*-Chloroaniline)	106-47-8	230	4200	(r)
Chlorobenzene	108-90-7	37	680	1
Chloroform	67-66-3	19 (k)	28 (k)	1
4-Chloro-3-methyl phenol (*p*-Chloro-*m*-cresol)	59-50-7	10000 (c)	10000 (c)	100
Chloromethane (Methyl chloride)	74-87-3	520	1000 (d)	10
2-Chlorophenol (*o*-Chlorophenol)	95-57-8	280	5200	10
Chromium – hexavalent (VI)	18540-29-9	**240; 270 (g); (i)**	**6100; 20 (g); (i)**	**(h)**
Chromium – trivalent (III)	16065-83-1	**120,000**	**(j)**	**(l)**
Chrysene	218-01-9	9	40	500
Copper	7440-50-8	600 (m)	600 (m)	(h)
Cyanide	57-12-5	1100	21000 (c)	(h)
4,4'-DDD (p,p'-TDE)	72-54-8	3	12	50
4,4'-DDE (p,p'-DDX)	72-55-9	2	9	50
4,4'-DDT	50-29-3	2	9	500
Dibenz(a,h)anthracene	53-70-3	0.66 (f)	0.66 (f)	100
Dibromochloromethane (Chlorodibromomethane)	124-48-1	110	1000 (d)	1
Di-n-butyl phthalate	84-74-2	5700	10000 (c)	100
Di-n-octyl phthalate	117-84-0	1100	10000 (c)	100
1,2-Dichlorobenzene (*o*-Dichlorobenzene)	95-50-1	5100	10000 (c)	50
1,3-Dichlorobenzene (*m*-Dichlorobenzene)	541-73-1	5100	10000 (c)	100

SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 5/12/99)

Contaminant	CASRN	(RDCSCC)	(NRDCSCC)	(IGWSCC)
1,4-Dichlorobenzene (*p*-Dichlorobenzene)	106-46-7	570	10000 (c)	100
3,3'-Dichlorobenzidine	91-94-1	2	6	100
1,1-Dichloroethane	75-34-3	570	1000 (d)	10
1,2-Dichloroethane	107-06-2	6	24	1
1,1-Dichloroethene	75-35-4	8	150	10
1,2-Dichloroethene (trans)	156-60-5	1000 (d)	1000 (d)	50
1,2-Dichloroethene (cis)	156-59-2	79	1000 (d)	1
2,4-Dichlorophenol	120-83-2	170	3100	10
1,2-Dichloropropane	78-87-5	10	43	(r)
1,3-Dichloropropene(cis and trans)	542-75-6	4	5 (k)	1
Dieldrin	60-57-1	0.042	0.18	50
Diethyl phthalate	84-66-2	10000 (c)	10000 (c)	50
2,4-Dimethyl phenol	105-67-9	1100	10000 (c)	10
Dimethyl phthalate	131-11-3	10000 (c)	10000 (c)	50
2,4-Dinitrophenol	51-28-5	110	2100	10
Dinitrotoluene(2,4-/2,6-mixture)	25321-14-6	1 (l)	4 (l)	10 (l)
Endosulfan	115-29-7	340	6200	50
Endrin	72-20-8	17	310	50
Ethylbenzene	100-41-4	1000 (d)	1000 (d)	100
Fluoranthene	206-44-0	2300	10000 (c)	100
Fluorene	86-73-7	2300	10000 (c)	100
Heptachlor	76-44-8	0.15	0.65	50
Hexachlorobenzene	118-74-1	0.66 (f)	2	100
Hexachlorobutadiene	87-68-3	1	21	100
Hexachlorocyclopentadiene	77-47-4	400	7300	100
Hexachloroethane	67-72-1	6	100	100
Indeno(1,2,3-cd)pyrene	193-39-5	0.9	4	500
Isophorone	78-59-1	1100	10000 (c)	50
Lead	7439-92-1	400 (p)	600 (q)	(h)

SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 5/12/99)

Contaminant	CASRN	(RDCSCC)	(NRDCSCC)	(IGWSCC)
Lindane (gamma BHC) (gamma HCH)	58-89-9	0.52	2.2	50
2-Methylphenol (o-creosol)	95-48-7	2800	10000 (c)	(r)
4-Methylphenol (*p*-creosol)	106-44-5	2800	10000 (c)	(r)
Methoxychlor	72-43-5	280	5200	50
Mercury	7439-97-6	14	270	(h)
4-Methyl-2-pentanone (MIBK)	108-10-1	1000 (d)	1000 (d)	50
Methylene chloride (Dichloromethane)	75-09-2	49	210	1
Naphthalene	91-20-3	230	4200	100
Nickel	7440-02-0	250	2400 (k) (n)	(h)
Nitrobenzene	98-95-3	28	520	10
N-Nitrosodiphenylamine	86-30-6	140	600	100
N-Nitrosodi-n-propylamine	621-64-7	0.66 (f)	0.66 (f)	10
PCBs (Polychlorinated biphenyls)	1336-36-3	0.49	2	50
Pentachlorophenol	87-86-5	6	24	100
Phenol	108-95-2	10000 (c)	10000 (c)	50
Pyrene	129-00-0	1700	10000 (c)	100
Selenium	7782-49-2	63	3100 (n)	(h)
Silver	7440-22-4	110	4100 (n)	(h)
Styrene	100-42-5	23	97	100
1,1,1,2-Tetrachloroethane	630-20-6	170	310	1
1,1,2,2-Tetrachloroethane	79-34-5	34	70 (k)	1
Tetrachloroethene (Tetrachloroethylene) (PCE)	127-18-4	4 (k)	6 (k)	1
Thallium	7440-28-0	2 (f)	2 (f)	(h)
Toluene	108-88-3	1000 (d)	1000 (d)	500
Toxaphene	8001-35-2	0.10 (k)	0.2 (k)	50
1,2,4-Trichlorobenzene	120-82-1	68	1200	100
1,1,1-Trichloroethane	71-55-6	210	1000 (d)	50
1,1,2-Trichloroethane	79-00-5	22	420	1
Trichloroethene (Trichloroethylene) (TCE)	79-01-6	23	54 (k)	1

SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 5/12/99)

Contaminant	CASRN	(RDCSCC)	(NRDCSCC)	(IGWSCC)
2,4,5-Trichlorophenol	95-95-4	5600	10000 (c)	50
2,4,6-Trichlorophenol	88-06-2	62	270	10
Vanadium	7440-62-2	370	7100 (n)	(h)
Vinyl chloride	75-01-4	2	7	10
Xylenes (Total)	1330-20-7	410	1000 (d)	[10] 67 (s)
Zinc	7440-66-6	1500 (m)	1500 (m)	(h)

Footnotes:

(a) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(b) Criteria are subject to change based on site specific factors (e.g., aquifer classification, soil type, natural background, environmental impacts, etc.).
(c) Health based criterion exceeds the 10,000 mg/kg maximum for total organic contaminants.
(d) Health based criterion exceeds the 1000 mg/kg maximum for total volatile organic contaminants.
(e) Cleanup standard proposal was based on natural background.
(f) Health based criterion is lower than analytical limits; cleanup criterion based on practical quantitation level.
(g) Criterion based on the inhalation exposure pathway.
(h) The impact to ground water values for inorganic constituents will be developed based upon site specific chemical and physical parameters.
(i) Site specific determination required for SCC for the allergic contact dermatitis exposure pathway.
(j) Contaminant not regulated for this exposure pathway.
(k) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(l) No criterion derived for this contaminant.
(m) Criterion based on ecological (phytotoxicity) effects.
(n) Level of the human health based criterion is such that evaluation for potential environmental impacts on a site by site basis is recommended.
(o) Level of the criterion is such that evaluation for potential acute exposure hazard is recommended.
(p) Criterion based on the USEPA Integrated Exposure Uptake Biokinetic (IEUBK) model utilizing the default parameters. The concentration is considered to protect 95% of target population (children) at a blood lead level of 10 *ug*/dl.
(q) Criteria were derived from a model developed by the Society for Environmental Geochemistry and Health (SEGH) and were designed to be protective for adults in the workplace.
(r) Insufficient information available to calculate impact to ground water criteria.
(s) Criterion based on new drinking water standard.